The right Honble Francis Lo: Veru-
lam, Viscount S^ct Alban. Mortuus 9 Aprilis,
Anno Dni. 1626. Annoq; Aetat 66.

יהוה

Et vidit Deus lucem quod esset bona

SYLVA SYLVARVM
or
A NATVRALL HISTORY
In ten Centuries.

Written by the right Honble Francis
Lo: Verulam Viscount S^ct Alban.

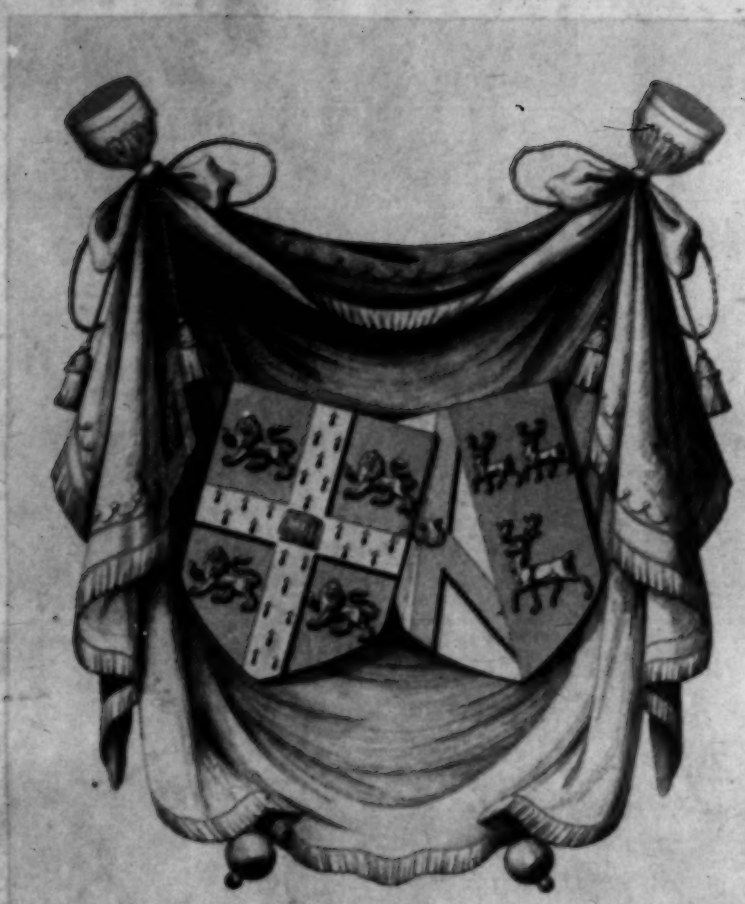
Published after ye Autho^rs Death
by W: RAWLEY D^r of Diui-
nity. &c

Tho: Cecill sculp:

LONDON
Printed for W: Lee and are to be sould at
the Great Turks head next to the Mytre
Taurne in Fleetstreet

Anno 1627

Sanguis erant Lacryma: quacunque foramina monit



Academiæ Cantabrigiensis
Liber.

SYLVA SYLVARVM:

OR

A Naturall Hiſtorie.

IN TEN CENTURIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS Lo. Verulam
Viſcount St. *ALBAN.*

Publiſhed after the Authors death,

By WILLIAM RAWLEY *Doctor of Diuinity, his* Maieſties *Chaplaine.*

The third Edition.

LONDON,
¶ Printed by *I. H.* for *William Lee* at the *Turkes Head* in *Fleet-ſtreet*, next to the *Miter*. 1631.

SYLVA:
OR
A Natural Hiſtorie.

IN TEN CENTURIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS Lo. Verulam
VISCOUNT ST. ALBAN.

Publiſhed according to the Authors deſire,
By WILLIAM RAWLEY, Doctor of Divinity,
his Majeſties Chaplain.

The third Edition.

LONDON,
Printed by J. H. for William Lee at the Turks
Head in Fleet-ſtreet, near to the Inner-Temple Gate. 1635.

TO THE MOST HIGH AND MIGHTY PRINCE, CHARLES, BY THE GRACE OF GOD, King of *Great Britaine*, *France*, and *Ireland*, Defender of the Faith, &c.

May it pleaſe your moſt Excellent Maieſty;

THe whole Body of the *Naturall Hyſtory*, either deſigned, or written, by the late *Lo. Viſcount S. Alban*, was dedicated to your *Maieſtie*, in his Booke *De Ventis*, about foure yeeres paſt, when your *Maieſtie* was *Prince*: So as there needed no new Dedication of this *Worke*, but only, in all humbleneſſe, to let your *Maieſtie* know, it is yours. It is true, if that *Lo.* had liued, your *Maieſtie*, ere long, had beene inuoked, to the Protection of another *Hiſtorie*: VVhereof, not *Natures Kingdome*, as in this, but

but theſe of your *Maieſties*, (during the Time and *Reigne* of *King Henry* the *Eighth*) had beene the Subiect: Which ſince it died vnder the Deſignation meerely, there is nothing left, but your *Maieſties* Princely Goodneſſe, graciouſly to accept of the Vndertakers Heart, and Intentions; who was willing to haue parted, for a while, with his Darling *Philoſophie*, that he might haue attended your Royall Commandement, in that other *Worke*. Thus much I haue beene bold, in all lowlineſſe, to repreſent vnto your *Maieſtie*, as one that was truſted with his *Lordſhips Writings*, euen to the laſt. And as this *Worke* affecteth the *Stampe* of your *Maieſties Royall Protection*, to make it more currant to the *World*; So vnder the *Protection* of this *Worke*, I preſume in all humbleneſſe to approach your *Maieſties* preſence; And to offer it vp into your *Sacred Hands*.

Your MAIESTIES *moſt Loyall*

and Deuoted Subiect,

W. RAWLEY.

To the Reader.

Hauing had the Honour to bee continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I haue thought it not amiſſe, (with his Lordſhips good leaue and liking,) for the better ſatisfaction of thoſe that ſhall reade it, to make knowne ſomewhat of his Lordſhips Intentions, touching the Ordering, and Publiſhing of the ſame. I haue heard his Lordſhip often ſay; that if hee ſhould haue ſerued the glory of his owne Name, hee had beene better not to haue publiſhed this *Naturall Hiſtory*: For it may ſeeme an Indigeſted Heape of Particulars; And cannot haue that Luſture, which Bookes caſt into Methods haue: But that he reſolued to preferre the good of Men, and that which might beſt ſecure it, before any thing that might haue Relation to Himſelfe. And he knew well, that

there was no other way open, to vnlooſe Mens mindes, being bound ;and (as it were) Maleficiate, by the Charmes of deceiuing Notions, and Theories ; and thereby made Impotent for Generation of Workes ; but onely no where to depart from the Senſe, and cleare experience ; But to keepe cloſe to it, eſpecially in the beginning : Beſides, this *Naturall Hiſtory* was a Debt of his, being Deſigned and ſet downe for a third part of the *Inſtauration*. I haue alſo heard his Lordſhip diſcourſe, that Men (no Doubt) will thinke many of the *Experiments* contained in this Collection, to bee Vulgar and Triuiall; Meane and Sordid; Curious and Fruitleſſe: And therefore hee wiſheth, that they would haue perpetually before their Eyes, what is now in doing; And the Difference betweene this *Naturall Hiſtory*, and others. For thoſe *Naturall Hiſtories*, which are Extant, being gathered for Delight and Vſe, are full of pleaſant Deſcriptions and Pictures ; and affect and ſeek after Admiration, Rarities, and Secrets. But contrariwiſe, the Scope which his Lordſhip intendeth, is to write ſuch a *Naturall Hiſtory*, as may be Fundamentall to the Erecting and Building of a true *Philoſophy* : For the illumination of the *Vnderſtanding*, the Extracting of *Axiomes*; and the producing of many Noble *Workes*, and *Effects*. For hee hopeth, by this meanes, to acquit Himſelfe of that, for which hee taketh

Himſelfe in a ſort bound; And that is, the Aduancement of all Learning & Sciences. For hauing in this preſent Worke Collected the Materials for the Building; And in his *Nouum Organū* (of which his Lordſhip is yet to publiſh a ſecond Part,) ſet downe the Inſtruments and Directions for the worke; Men ſhall now bee wanting to themſelues, if they raiſe not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalfe, I haue heard his Lordſhip ſpeake complainingly; That his Lordſhip (who thinkth hee deſerueth to bee an Architect in this building,) ſhould bee forced to bee a Work-man and a Labourer; And to dig the Clay and burne the Brick; And more than that, (according to the hard Condition of the *Ffraelites* at the latter end) to gather the Straw and Stubble, ouer all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will bee done: Men are ſo ſet to deſpiſe the Meanes of their owne good And as for the *Baſeneſſe* of many of the Experiments; As long as they be Gods Works, they are Honourable enough. And for the *Vulgarneſſe* of them; true *Axiomes* muſt bee drawne from plaine Experience, and not from doubtfull; And his Lordſhips courſe is, to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewiſe muſt bee broken and grinded, and not whole, or as it

groweth. And for *Vſe*; his Lordſhip hath often in his Mouth, the two kinds of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments* of *Vſe*, and *Experiments* of *Light*; And hee reporteth himſelfe, whether hee were not a ſtrange Man, that ſhould thinke that Light hath no Vſe, becauſe it hath no Matter. Further, his Lordſhip thought good alſo, to adde vnto many of the *Experiments* themſelues, ſome *Gloſſe* of the *Cauſes*; that in the ſucceding worke of *Interpreting Nature*, and *Framing Axiomes*, all things may bee in more Readineſſe. And for the *Cauſes* herein by him aſſigned; his Lordſhip perſwadeth Himſelfe, they are farre more certaine, than thoſe that are rendred by Others, not for any Excellency of his owne VVit (as his Lordſhip is wont to ſay) but in reſpect of his continuall Conuerſation with *Nature* and *Experience*. Hee did conſider likewiſe, that by his Adition of *Cauſes*, Mens minds (which make ſo much haſte to find out the *Cauſes* of things;) would not thinke themſelues vtterly loſt, in a Vaſt VVood of *Experience*, but ſtay vpon theſe *Cauſes* (ſuch as they are) a litle, till true *Axiomes* may bee more fully diſcouered. I haue heard his Lordſhip ſay alſo, that one great Reaſon, why hee would not put theſe particulars into any exact *Method* (though hee that looketh attentiuely into them ſhall finde that they haue a ſecret

Order) was, becauſe hee conceiued that other men would now thinke, that they could doe the like; And ſo goe on with a further Collection; which if the *Method* had beene Exact, many would haue deſpaired to attaine by Imitation. As for his Lordſhips loue of Order, I can refer any Man to his Lordſhips Latine Booke, *De Augmentis Scientiarum*; which (if my Iudgement bee any thing) is written in the Exacteſt Order, that I know any Writing to be. I will conclude with an vſuall Speech of his Lordſhips; That this Worke of his *Naturall Hiſtory*. is the *World* as God made it, and not as Men haue made it; For that it hath nothing of Imagination.

W. Rawley.

This Epiſtle is the ſame, that ſhould haue beene prefixed to this Booke, if his Lordſhip, had liued.

This Epistle the Epistle that should have been placed to the Books, than Epistle had [illegible]

NATVRALL HISTORIE.

I. Century.

DIgge a *Pit* vpon the *Sea-ſhore*, ſomewhat aboue the High-Water Marke, and ſinke it as deepe as the Low-Water Marke; And as the *Tide* commeth in, it will fill with *water*, Freſh and Potable. This is commonly practiſed vpon the Coaſt of *Barbarie*, where other freſh *water* is wanting. And CAESAR knew this well, when hee was beſieged in *Alexandria*: For by digging of *Pits* in the *Sea-ſhore*, hee did fruſtrate the Laborious Workes of the Enemies, which had turned the *Sea-water* upon the Wels of *Alexandria*; And ſo ſaued his Armie, being then in Deſperation. But *Cæſar* miſtooke the Cauſe; For he thought that all *Sea-Sands* had Naturall Springs of *Freſh water*. But it is plaine, that it is the *Sea-Water*; becauſe the Pit filleth according to the Meaſure of the *Tide*: And the *Sea-water* paſſing or Straining thorow the Sands, leaueth the Saltneſſe.

1 Experiments in *Conſort* touching the Straining and paſſing of Bodies, one thorow another: which they call *Percolation*.

I remember to haue read, that Triall hath beene made of *Salt water* paſſed thorow *Earth*; thorow Ten Veſſels, one within another, and yet it hath not loſt his Saltneſſe, as to become potable: But the ſame Man ſaith, that (by the Relation of Another) *Salt water* drained thorow Twenty Veſſels hath become Freſh. This *Experiment* ſeemeth to croſſe that other of *Pits*, made by the *Sea-ſide*; And yet but in part, if it be true that twenty Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common courſe of *Experiments*, except they bee led by great Iudgement, and ſome good Light of *Axiomes*. For firſt, there is no ſmall difference betweene a

2

Paſſage

Dorothy Jermey

Dorothy Jermey

Passage of *Water* thorow twenty small Vessels; And thorow such a distance, as betweene the Low water, and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not straine the Water so finely, as Sand doth. But there is a Third Point, that I suspect as much, or more, than the other Two: And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *Water* riseth; But in the *Experiment* of Transmission of the *Water* thorow the Vessels, it falleth: Now certaine it is, that the Salter Part of *Water*, (once Salted thorow-out) goeth to the Bottome. And therefore no maruell, if the Draining of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike off the Salt Part, than where the *Water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*; Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body thorow which the *Transmission* is made. As if thorow a woolen Bagge, the Liquor leaueth the Fatnesse; If thorow Sand, the Saltnesse; &c. They speake of Severing Wine from Water, passing it thorow Iuy wood, or thorow other the like porous Body; But *Non Constat*.

4 The *Gumme* of *Trees* (which wee see to bee commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, thorow the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rocke Rubies*, (which are yet more resplendent than *Gummes*) are the fine Exudations of *Stones*.

5 *Aristotle* giueth the Cause, vainely, why the *Feathers* of *Birds* are of more liuely Colours, than the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. Hee saith, it is, because *Birds* are more in the Beames of the Sunne, than *Beasts*; But that is manifestly vntrue; For *Cattle* are more in the Sun than *Birds*, that liue commonly in the Woods, or in some Couert. The true Cause is, that the Excrementious Moisture of liuing Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* thorow a finer and more delicate Strainer, than it doth in *Beasts*: For *Feathers* passe thorow Quils; And *Haire* thorow Skin.

6 The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleauing Body is Mixed and Agitated with the *Liquors*; whereby the grosser Part of the *Liquor* stickes to that Cleauing Body; And so the Finer Parts are freed from the Grosser. So the *Apothecaries* clarifie their *Sirrups* by whites of Egges, beaten with the Iuices which they would clarifie; which Whites of Egges, gather all the Dregges and grosser Parts of the Iuice to them; And after the *Sirrup* being set on the Fire, the Whites of Egges themselues harden, and

are

are taken forth. So *Ippocraſſe* is clarified by mixing with Milke; And ſtirring it about; And then paſſing it thorow a Woollen Bag, which they call *Hippocrates Sleeue*: And the Cleauing Nature of the Milke draweth the Powder of the Spices, and Groſſer Parts of the *Liquor* to it; And in the paſſage they ſticke vpon the Woolen Bag.

The *Clarifying* of *water*, is an *Experiment* tending to Health; beſides the pleaſure of the Eye, when *water* is Chryſtalline. It is effected by caſting in and placing Pebbles, at the Head of a Current; that the *water* may ſtraine thorow them. 7

It maybee, *Percolation* doth not onely cauſe Cleareneſſe and Splendor, but Sweetneſſe of Sauour; For that alſo followeth, as well as Cleareneſſe, when the Finer Parts are ſeuered from the Groſſer. So it is found, that the Sweats of men that haue much Heat, and exerciſe much, and haue cleane Bodies, and fine Skins; doe ſmell ſweet; As was ſaid of *Alexander*; And wee ſee commonly, that *Gummes* haue ſweet Odours. 8

Experiments in Conſort touching *Motion* of *Bodies* vpon their *Preſſure*.

TAke a *Glaſſe*, and put *water* into it, and wet your Finger, and draw it round about the Lip of the Glaſſe, preſſing it ſomewhat hard; And after you haue drawne it ſome few times about; it will make the Water friske and ſprinckle vp in a fine Dew. This *Inſtance* doth excellently Demonſtrate the Force of *Compreſſion* in a Sollid Body. For whenſoever a Sollid Body (as Wood, Stone, Mettall, &c.) is preſſed, there is an inward Tumult in the Parts thereof; ſeeking to deliuer themſelues from the Compreſſion: And this is the Cauſe of all *Violent Motion*. Wherein it is ſtrange in the higheſt Degree, that this *Motion* hath neuer beene obſerued, nor inquired: It being of all *Motions*, the moſt Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at firſt, by way of Proofe, and Search, which way to deliuer it ſelfe; And then worketh in progreſſe, where it findeth the Deliuerance eaſieſt. In *Liquors* this *Motion* is viſible: For all Liquors ſtrucken make round Circles, and withall Daſh; but in *Solids*, (which breake not) it is ſo ſubtill; as it is inuiſible; But neuertheleſſe bewrayeth it ſelfe by many Effects; As in this *Inſtance* whereof wee ſpeake. For the *Preſſure* of the Finger furthered by the wetting (becauſe it ſticketh ſo much the better vnto the Lip of the *Glaſſe*) after ſome continuance, putteth all the ſmall Parts of the *Glaſſe* into worke; that they ſtrike the *water* ſharply: from which *Percuſſion* that Sprinkling commeth. 9

If you ſtrike or pierce a *Solid Body*, that is brittle, as *Glaſſe*, or *Sugar*, it breaketh not onely, where the immediate force is; but breaketh all about into ſhiuers and fitters; The *Motion*, vpon the *Preſſure*, ſearching all wayes; and breaking where it findeth the *Body* weakeſt. 10

The *Powder* in *Shot*, being Dilated into ſuch a *Flame*, as endureth not *Compreſſion*; Moueth likewiſe in round (The *Flame* being in the Nature of a *Liquid Body*:) Sometimes recoiling; Sometimes breaking the *Peece*; 11

but

But generally discharging the *Bullet*, because there it findeth easiest Deliuerance.

12 This *Motion* vpon *Presſure*, and the Reciprocall thereof, which is *Motion* vpon *Tenſure*; wee vse to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Demension, deliuereth and restoreth it selfe to the Naturall: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloth* tentured spring backe. These two *Motions* (of which there bee infinite instances) we shall handle in due place.

13 This *Motion* vpon *Presſure* is excellently also demonstrated in *Sounds*; As when one Chimeth vpon a *Bell*, it soundeth; but as soone as hee layeth his hand vpon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soone as the Quill of a Iacke falleth vpon it, stoppeth. For these *Sounds* are produced, by the subtill Percussion of the Minute parts, of the *Bell*, or *String*, vpon the Aire; All one, as the *water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, vpon the Water, whereof wee spake a little before in the ninth *Experiment*. For you must not take it to bee, the locall *Shaking* of the *Bell*, or *String*, that doth it. As wee shall fully declare, when wee come hereafter to handle *Sounds*.

Experiments in *Consort* touching *Separations* of *Bodies* by *weight*.

14 TAke a *Glasse* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, whereinto put *Claret Wine* and *Water* mingled: Reuerse the first *Glasse*, with the *Belly* vpwards, Stopping the *Neb* with your finger; Then dip the Mouth of it within the Second *Glasse*, and remoue your Finger: Continue it in that posture for a time; And it will vnmingle the *Wine* from the *Water*: The *Wine* ascending and setling in the top of the upper *Glasse*; And the *Water* descending and setling in the bottome of the lower *Glasse*. The passage is apparant to the Eye; For you shall see the *Wine*, as it were, in a small veine, rising thorow the *Water*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the vpper *Glasse* vpon a Naile. But as soone as there is gathered so much pure and vnmixed *water* in the bottome of the Lower *Glasse*, as that the Mouth of the vpper *Glasse* dippeth into it, the *Motion* ceaseth.

15 Let the Vpper *Glasse* bee *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Vpper *Glasse* bee *Water* pure, the Lower *Water* coloured; or contrariwise; there followeth no *Motion* at all.

01 But it hath beene tried, that though the Mixture of *Wine* and *Water*, in the Lower *Glasse*, bee three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* and *Wine* appeareth to bee made by *Weight*; for it must bee of *Bodies* of vnequall *Weight*, or else it worketh not; And the Heauier *Body* must euer bee in the vpper *Glasse*. But then note withall, that the *Water* being made pensile, and there being a great *Weight* of *water* in the *Belly* of the *Glasse*, sustained

11 by

by a ſmall Pillar of *Water* in the Necke of the *Glaſſe*; It is that, which ſetteth the *Motion* on worke: For *Water* and *Wine* in one *Glaſſe*, with long ſtanding, will hardly ſeuer.

This *Experiment* would be Extended from Mixtures of ſeueral *Liquours* to *Simple Bodies*, which Conſiſt of ſeuerall Similare Parts: Try it therefore with *Brine* or *Salt Water*, and *Freſh Water*; Placing the *Salt water* (which is the heauier) in the vpper *Glaſſe*. And ſee whether the *Freſh* will come aboue. Try it alſo with *Water thicke Sugred*, and *Pure Water*; and ſee whether the *Water* which commeth aboue, will loſe his ſweetneſſe: For which purpoſe it were good there were a little Cocke made in the Belly of the vpper *Glaſſe*. 16

IN *Bodies* containing Fine Spirits, which doe eaſily diſſipate, when you make *Infuſions*, the Rule is; A ſhort ſtay of the *Body* in the *Liquor* receiueth the Spirit; And a longer Stay confoundeth it; becauſe it draweth forth the Earthly Part withall; which embaſeth the finer. And therefore it is an Errour in *Phyſitians*, to reſt ſimply vpon the Length of ſtay, for increaſing the vertue. But if you will haue the *Infuſion* ſtrong, in thoſe kinde of *Bodies*, which haue fine Spirits, your way is, not to giue Longer time, but to repeat the *Infuſion* of the *Body* oftner. Take *Violets*, and infuſe a good Pugill of them in a Quart of Vineger; Let them ſtay three quarters of an houre, and take them forth; And refreſh the *Infuſion* with like quantity of new *Violets*, ſeuen times; And it will make a Vineger ſo freſh of the *Flower*, as if a Twelue-moneth after, it bee brought you in a Saucer, you ſhall ſmell it before it come at you. Note, that it ſmelleth more perfectly of the Flower, a good while after, than at firſt. Experiments in *Conſort* touching *Iudicious* and *Accurate Infuſions*, both in *Liquors*, and *Aire*. 17

This Rule, which wee haue giuen, is of ſingular vſe, for the Preparations of *Medicines*, and other *Infuſions*. As for Example; The Leafe of *Burrage* hath an excellent Spirit, to repreſſe the Fuliginous Vapour of Dusky Melancholy, and ſo to cure Madneſſe: But neuertheleſſe, if the Leafe be infuſed long, it yeeldeth forth but a raw ſubſtance, of no Vertue; Therefore I ſuppoſe, that if in the Muſt of Wine, or Wort of Beere, while it worketh, before it bee Tunned, the *Burrage* ſtay a ſmall time, and bee often changed with freſh; It will make a Soueraigne Drinke for Melancholy Paſſions. And the like I conceiue of *Orenge Flowers*. 18

Rubarb hath manifeſtly in it Parts of contrary Operations: Parts that purge; And parts that binde the Body: And the firſt lay looſer, and the latter lay deeper: So that if you infuſe *Rubarb* for an houre, and cruſh it well, it will purge better, and binde the Body leſſe after the purging, than if it ſtood twenty foure houres; This is tried: But I conceiue likewiſe, that by Repeating the *Infuſion* of *Rubarb*, ſeuerall times, (as was ſaid of Violets) letting each ſtay in but a ſmall time; you may make it as ſtrong a *Purging Medicine*, as *Scammony*. And it is not a ſmall thing wonne in *Phyſicke*, if you can make *Rubarb*, and other *Medi-* 19

cines that are *Benedict*, as ſtrong Purgers, as thoſe that are not without ſome Malignity.

20 *Purging Medicines*; for the moſt part, haue their *Purgatiue* Vertue, in a fine Spirit; As appeareth by that they endure not boiling, without much loſſe of Vertue. And therefore it is of good vſe in *Phyſicke*, if you can retaine the *Purging* Vertue, and take away the Vnpleaſant taſte of the *Purger*; which it is like you may doe; by this courſe of *Infuſing* oft, with little ſtay. For it is probable, that the Horrible and Odious Taſte, is the Groſſer part.

21 Generally, the working by *Infuſions*, is groſſe and blinde, except you firſt try the Iſſuing of the ſeuerall Parts of the Body, which of them Iſſue more ſpeedily, and which more ſlowly; And ſo by apportioning the time, can take and leaue that Quality, which you deſire. This to know, there be two wayes; The one to try what long ſtay, and what ſhort ſtay worketh, as hath beene ſaid: The other to try in Order, the ſucceeding *Infuſions*, of one and the ſame Body, ſucceſſiuely, in ſeuerall *Liquours*. As for example; Take *Orenge-Pils*, or *Roſe-Mary*, or *Cinnamon*, or what you will; And let them *Infuſe* halfe an houre in *Water*: Then take them out, and *Infuſe* them againe in other *Water*; And ſo the third time: And then taſte and conſider the *Firſt Water*, the *Second*, and the *Third*: And you will finde them differing, not onely in Strength and Weakneſſe, but otherwiſe in Taſte, or Odour; For it may bee the *Firſt Water* will haue more of the Scent, as more Fragrant; And the *Second* more of the Taſte, as more Bitter or Biting, &c.

22 *Infuſions* in *Aire*, (for ſo we may well call *Odours*) haue the ſame diuerſities with *Infuſions* in *water*; In that the ſeuerall *Odours* (which are in one Flower, or other Body) iſſue at ſeuerall times; Some earlier, ſome later: So wee finde that *Violets*, *Woodbines*, *Strawberies*, yeeld a pleaſing Scent, that commeth forth firſt; But ſoone after an ill Scent, quite differing from the Former; Which is cauſed, not ſo much by Mellowing, as by the late iſſuing of the Groſſer Spirit.

23 As wee may deſire to extract the fineſt Spirits in ſome Caſes; So wee may deſire alſo to diſcharge them (as hurtfull) in ſome other. So *Wine burnt*, by reaſon of the Euaporating of the finer Spirit, enflameth leſſe, and is beſt in Agues: *Opium* leeſeth ſome of his poiſonous Quality, if it be vaporated out, mingled with *Spirit of Wine*, or the like: *Seam* leeſeth ſomewhat of his windineſſe by Decocting; And (generally) ſubtill or windy Spirits are taken off by incenſion, or Euaporation. And euen in *Infuſions* in things that are of too high a Spirit, you were better powre off the firſt *Infuſion*, after a ſmall time, and vſe the latter.

Experiment Solitary touching the *Appetite* of *Continuations in Liquids*.

24. *Bvbbles* are in the forme of an *Hemiſphere*; *Aire* within, and a little Skin of *water* without: And it ſeemeth ſomewhat ſtrange, that the *Aire* ſhould riſe ſo ſwiftly, while it is in the *water*; And when it commeth to the Top, ſhould bee ſtaid by ſo weake a Couer as that of the *Bubble* is. But as for the ſwift Aſſent of the *Aire*, while it is vnder

the *Water*, that is a *Motion* of *Percuſſion* from the *Water*; which it ſelfe deſcending, driueth vp the Aire; And no *Motion* of *Leuity* in the *Aire*. And this *Democritus* called *Motus Plagæ*. In this Common *Experiment*, the Cauſe of the Encloſure of the *Bubble* is, for that the Appetite to reſiſt Separation, or Diſcontinuance (which in ſollid *Bodies* is ſtrong) is alſo in *Liquours*, though fainter and weaker; As wee ſee in this of the *Bubble*: Wee ſee it alſo in little Glaſſes of Spittle that children make of Ruſhes; And in Caſtles of Bubbles, which they make by blowing into *Water*, hauing obtained a little Degree of Tenacity by Mixture of Soape: Wee ſee it alſo in the *Stillicides* of *Water*, which if there bee *Water* enough to follow, will Draw themſelues into a ſmall thred, becauſe they will not diſcontinue; But if there bee no Remedy, then they caſt themſelues into round Drops; Which is the Figure, that ſaueth the Body moſt from Diſcontinuance: The ſame Reaſon is of the Roundneſſe of the *Bubble*, as well for the Skin of *Water*, as for the *Aire* within: For the *Aire* likewiſe auoideth *Diſcontinuance*; And therefore caſteth it ſelfe into a Round Figure. And for the ſtop and Arreſt of the *Aire* a little while, it ſheweth that the *Aire* of it ſelfe hath little, or no Appetite, or Aſcending.

THE Reiection, which I continually uſe, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the Worke, and of great Vſe, I receiue it, but deliuer it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may bee made thus: Finde out a hanging Ground, where there is a good quicke Fall of Raine-water. Lay a Halfe-Trough of Stone, of a good length, three or foure foot deepe within the ſame Ground; with one end vpon the High Ground, the other vpon the Low. Couer the Trough with Brakes a good thickneſſe, and caſt Sand upon the Top of the Brakes: You ſhall ſee (ſaith hee) that after ſome ſhowers are paſt, the lower End of the Trough will run like a *Spring* of *water*: which is no maruell, if it hold, while the Raine-water laſteth; But hee ſaid it would continue long time after the Raine is paſt: As if the water did multiply it ſelfe vpon the Aire, by the helpe of the Coldneſſe and Condenſation of the Earth, and the Conſort of the firſt Water.

Experiment Solitary touching the Making of *Artificiall Springs*. 25

THE *French* (which put off the Name of the *French Diſeaſe*; vnto the Name of the *Diſeaſe* of *Naples*) doe report, that at the Siege of *Naples*, there were certaine wicked Merchants, that Barrelled vp *Mans fleſh* (of ſome that had beene, lately ſlaine in *Barbery*) and ſold it for *Tunny*; And that vpon that foule and high Nouriſhment, was the Originall of that *Diſeaſe*. Which may well bee; For that it is certaine, that the *Canibals* in the *Weſt Indies*, eat *Mans Fleſh*; And the *Weſt Indies* were full of the Pockes when they were firſt diſcouered: And at this day the *Mortalleſt Poiſons*, practiſed by the *Weſt-Indians*, haue ſome Mixture of the Bloud, or Fat, or Fleſh of *Man*: And diuers Witches, and

Experiment Solitary touching the *Venemous Quality* of *Mans fleſh*. 26

Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, haue fed vpon *Mans flesh*, to aid (as it seemeth) their Imagination, with High and foule Vapours.

Experiment Solitary touching the *Version* and *Transmutation* of *Aire* into *Water*. 27

IT seemeth that there bee these wayes (in likelihood) of *Version*, of *Vapours*, or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly condense; As wee see in the *Contracting of the Aire* in the *Weather-Glasse*; Whereby it is a Degree nearer to *Water*. Wee see it also in the *Generation of Springs*, which the *Ancients* thought (very probably) to bee made by the *Version* of *Aire* into *Water*, holpen by the *Rest*, which the *Aire* hath in those Parts; Whereby it cannot dissipate. And by the *Coldnesse of Rockes*; For there *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; Which produceth *Dewes*, and *Raines*. And the Experiment of turning *Water* into *Ice*, by Snow, Nitre, and Salt (whereof wee shall speake hereafter) would bee transferred to the Turning of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, where the Vapour is turned backe, vpon it selfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* vpon the Couers of *Boyling Pots*; And in the *Dew* towards *Raine*, vpon *Marble*, and *Wainscot*. But this is like to doe no great effect; Except it bee vpon Vapours, and grosse *Aire*, that are already very neere in Degree to Water. The Third is that, which may bee searched into, but doth not yet appeare; which is, by *Mingling* of *Moist Vapours* with *Aire*; And trying if they will not bring a Returne of more *Water*, than the *Water* was at first: For if so; That Increase is a *Version* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the Neb stopped; Weigh the *Water* first; Hang in the Middle of the *Stillatory* a large *Spunge*; And see what Quantity of *Water* you can crush out of it; And what it is more, or lesse, compared with the *Water* spent; For you must vnderstand, that if any *Version* can bee wrought, it will bee easilyest done in small Pores: And that is the Reason why wee prescribe a *Spunge*. The Fourth way it Probable also, though not Appearing; Which is, by *Receiuing the Aire* into the small *Pores of Bodies*; For (as hath beene said) euery thing in small Quantity is more easie for *version*; And Tangible Bodies haue no pleasure in the Consort of *Aire*, but endeuour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in *loose Bodies*, as *Sand* and *Powder*; which we see, if they lie close of themselues gather Moisture.

Experiment Solitary touching *Helpes* towards the *Beauty* and *good features* of *Persons*. 28

IT is reported by some of the *Ancients*; That *whelps*, or other *Creatures*, if they bee put Young, into such a Cage, or Box, as they can not rise to their Stature, but may increase in Bredth, or Length; will grow accordingly, as they can get Roome: which if it bee true, and faisible, and that the young *Creature* so pressed, and streightned,

tened, doth not thereupon dye; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange Figure. This is certaine, and noted long ſince; That the Preſſure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, betweene the Hands, was noted of Old, to make *Macrocephali*; which ſhape of the Head, at that time, was eſteemed. And the Raiſing gently of the Bridge of the Noſe, doth preuent the deformity of a Saddle-Noſe. Which obſeruation well weighed, may teach a Meanes, to make the Perſons of Men, and Women, in many kindes, more comely, and better featured, than otherwiſe they would bee; By the Forming and Shaping of them in their Infancy: As by Stroaking vp the Calues of the Legs, to keepe them from falling downe too low; And by Stroaking vp the Fore-head to keepe them from being low-foreheaded. And it is a common Practiſe to ſwathe Infants, that they may grow more ſtreight and better ſhaped: And we ſee Young Women, by wearing ſtreight Bodies, keepe themſelues from being Groſſe, and Corpulent.

Experiment Solitary touching the *Condenſing* of *Aire*, in ſuch ſort as it may put on *Weight*, and yeeld *Nouriſhment*.

29

ONions, as they hang, will many of them ſhoot forth; And ſo will *Penni roiall*; And ſo will an Herbe called *Orpin*; with which they vſe, in the Countrey, to trim their Houſes, binding it to a Lath, or Sticke, and ſetting it againſt a Wall. We ſee it likewiſe, more eſpecially, in the greater *Semper-viue*, which will put out Branches, two or three yeares: But it is true, that commonly they wrap the Root in a Cloth beſmeared with *Oile*, and renue it once in halfe a Yeare. The like is reported by ſome of the *Ancients*, of the *Stalkes of Lillies*. The Cauſe is; For that theſe *Plants* haue a Strong, Denſe, and Succulent Moiſture, which is not apt to exhale; And ſo is able, from the Old ſtore, without drawing helpe from the Earth, to ſuffice the ſprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the times of putting forth. Wee ſee alſo, that *Stumps* of *Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Conſequence, to try whether theſe things, in the Sprouting, doe increaſe *Weight*; which muſt bee tried by weighing them before they bee hanged vp; And afterwards againe, when they are Sprouted. For if they increaſe not in *Weight*; Then it is no more but this; That what they ſend forth in the Sprout, they leeſe in ſome other Part: But if they gather *Weight*, then it is *Magnale Naturæ*; For it ſheweth that *Aire* may bee made ſo to bee Condenſed, as to be conuerted into a *Denſe Body*; whereas the Race and the Period of all things, here aboue the Earth, is to extennate and turne things to be more *Pneumaticall*, and Rare, And not to bee Retrograde, from *Pneumaticall* to that which is *Denſe*. It ſheweth alſo, that *Aire* can *Nouriſh*; which is another great Matter of Conſequence. Note, that to try this, the *Experiment* of the *Semper-viue* muſt be made without Oiling the Cloth; For elſe it may be, the *Plant* receiueth Nouriſhment from the Oile.

Experiment Solitary touching the *Commixture* of *Flame* and *Aire*, And the *great force* thereof.

30

Flame and *Aire* doe not Mingle, except it bee in an *Inſtant*; Or in the *vitall ſpirits* of *Vegetables* and *Liuing Creatures*. In *Gunpowder*, the Force of it hath beene aſcribed, to Rarefaction of the Earthly Subſtance into *Flame*: And thus farre it is true: And then (forſooth) it is become another Element; the Forme whereof occupieth more place; And ſo, of Neceſſity, followeth a Dilatation: And therefore, leſt two Bodies ſhould bee in one place, there muſt needs alſo follow an Expulſion of the Pellet; Or Blowing vp of the Mine. But theſe are Crude and Ignorant Speculations. For *Flame*, if there were nothing elſe, except it were in very great quantity, will bee ſuffocate with any hard Body, ſuch as a Pellet is, or the Barrell of a Gunne; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not ſuffer it to kindle, or ſpread. But the cauſe of this ſo potent a Motion, is the *Nitre*, (which wee call otherwiſe *Salt-Petre*;) which hauing in it a notable Crude and windy *Spirit*, firſt, by the *Heat* of the *Fire* ſuddenly dilateth it ſelfe; (And wee know that ſimple *Aire*, being preternaturally attenuated by *Heat*, will make it ſelfe Roome, and breake and blow vp that which reſiſteth it;) And Secondly, when the *Nitre* hath dilated it ſelfe, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we ſee that *Brimſtone*, *Pitch*, *Camphire*, *Wilde-Fire*, and diuers other Inflamable Matters, though they burne cruelly, and are hard to quench; Yet they make no ſuch fiery winde, as *Gunpowder* doth: And on the other ſide, wee ſee that *Quick ſiluer*; (which is a moſt Crude and Watry *Body*) heated, and pent in, hath the like force with *Gun-powder*. As for *Liuing Creatures*, it is certaine, their *Vitall Spirits* are a Subſtance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath ſome fixing, they will. For that you may beſt ſee in thoſe two Bodies (which are their *Aliments*,) *Water*, and *Oile*; For they likewiſe will not well mingle of themſelues, but in the Bodies of *Plants* and *Liuing Creatures*, they will. It is no maruell therefore, that a ſmall *Quantity* of *Spirits*, in the Cells of the Braine, and Canales of the Sinewes, are able to moue the whole Body, (which is of ſo great Maſſe) both with ſo great Force, as in Wreſtling, Leaping; And with ſo great Swiftneſſe, As in playing Diuiſion vpon the *Lute*. Such is the force of theſe two Natures, *Aire* and *Flame*, when they incorporate.

Experiment Solitary touching the *Secret Nature* of *Flame*.

31

TAke a ſmall *Wax-Candle*, and put it in a Socket, of Braſſe, or Iron: Then ſet it vpright in a Porringer full of *Spirit of Wine*, heated; Then ſet both the *Candle*, and *Spirit of Wine*, on fire, and you ſhall ſee the *Flame* of the *Candle*, open it ſelfe, and become foure or fiue times bigger than otherwiſe it would haue beene; and appeare in Figure *Globular*, and not in *Piramis*. You ſhall ſee alſo, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blue towards the Colour of the Outward *Flame* of the *Spirit of Wine*. This is a Noble;

Inſtance

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not, but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a Piramis in *Flame*, which we usually see, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would bee Round: And therefore *Smoake* is in the Figure of a Piramis Reuersed; For the *Aire* quencheth the *Flame*, and receiueth the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and moue vpwards, but moueth wauing, and to and fro: As if *Flame* of his owne Nature (if it were not quenched) would rowle and turne, as well as move upwards. By all which it should seeme that the Cæleстiall Bodies, (most of them) are true *Fires*, or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and determinate; They haue Rotation; And they haue the Colour and Splendour of *Flame*: So that *Flame* aboue is Durable, and Consistent, and in his Naturall place; But with vs, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

TAke an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth, you shall finde those Parts of the *Arrow*, which were on the Outsides of the *Flame*, more burned, blacked, and turned almost into a Coale; whereas that in the Middest of the *Flame*, will bee, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discouery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the Sides, than in the Middest: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked and pent. And therefore the *Peripatetickes* (how soeuer their opinion of an *Element* of *Fire* aboue the *Aire* is iustly exploded;) in that Point they acquit themselves well: For being opposed, that if there were a *Spheare* of *Fire* that incompassed the Earth so neere hand, it were impossible but all things should be burnt up; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment Solitary touching the *Different force* of *Flame* in the *Middest* and on the *Sides*. 32

IT is affirmed constantly by many, as an usuall Experiment; That a *Lumpe* of *Vre* in the *Bottome* of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the *Top* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tried to the full: For it is very probable, that the *Motion*

Experiment Solitary touching the *Decrease* of the *Naturall motion* of *Grauity* in *great distance from the Earth*, or *within some depth of the Earth*. 33

of Gravity worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Apetite of Vnion of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Morning to a *Point* or place (which was the Opinion of the *Ancients*) it is a meere Vanity.

Experiment Solitary touching the *Contraction* of *Bodies* in *Bulke*, by the *Mixture* of the more *Liquid Body* with the more *Solid*.

34

IT is strange, how the *Ancients* tooke vp *Experiments* vpon credit, and yet did build great Matters vpon them. The Observation of some of the best of them, delivered confidently is, That *Vessell* filled with *Ashes* will receive the like quantity of *Water*, that it would haue done, if it had beene empty. But this is vtterly vntrue; for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Ashes*; As wee see that *Ashes* alone, if they bee hard prest, will lye in lesse roome: And so the *Ashes* with Aire betweene, lye looser; And with *Water*, closer. For I haue not yet found certainly, that the *Water*, it selfe, by mixture of *Ashes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment Solitary touching the *Making Vines* more *fruitfull*.

35

IT is reported of credit, that if you lay good store of *Kernels* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier, and prosper better. It may bee tried with other *Kernels*, laid about the *Root* of a *Plant* of the same kinde; As *Figs*, *Kernels* of *Apples*, &c. The Cause may bee, for that the *Kernels* draw out of the Earth Iuice fit to nourish the *Tree*, as those that would bee *Trees* of themselues, though there were no *Root*; But the *Root* being of greater strength, robbeth and deuoureth the Nourishment, when they haue drawne it: As great *Fishes* deuoure little.

Experiments in Consort touching *Purging Medicines*.

36

THE *Operation* of *Purging Medicines*, and the *Causes* thereof, haue beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Quality*, And the like Shifts of Ignorance. The *Causes* of *Purging* are diuers; All plaine and perspicuous; And throughly maintained by Experience. The first is, That whatsoeuer cannot bee ouercome and digested by the *Stomacke*, is by the *Stomacke*, either put vp by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts of the Body* (as the *Orifices* of the *Veines*, and the like) are moued to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Blacke Hellebore*, &c. And of *Secret Malignity*, and disagreement towards *Mans Bodie*, many times not appearing much in the Taste; As in *Scamony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*, that

that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to bee held suspected, as a kinde of *Poison*; For that it worketh either by *Corrosion*; Or by a *Secret Malignity* and Enmity to *Nature*: And therefore such *Medicines* are warily to be prepared, and vsed. The *Quantity* of that which is taken, doth also cause *Purging*; as wee see in a great *Quantity of New Milke* from the Cow; yea, and a great *Quantity of Meat*; For *Surfets* many times turne to *Purges*, both vpwards, and downwards. Therefore we see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a proofe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantity*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery Veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the Fundament, doth prouoke the Part to expell; And *Mustard* prouoketh Sneezing: And any sharpe Thing to the Eyes, prouoketh Teares. And therefore wee see that almost all *Purgers* haue a kinde of *Twitching* and *Vellication*, besides the *Griping* which commeth of winde. And if this *Mordication* bee in an ouer-high Degree, it is little better than the *Corrosion* of *Poison*; And it commeth to passe sometimes in *Antimony*; Especially if it be giuen, to Bodies not repleat with Humors; For where Humors abound, the Humors saue the Parts. 37

The third *Cause* it *Attraction*: For I doe not deny, but that *Purging Medicines* haue in them a direct Force of *Attraction*; As *Drawing Plasters* haue in *Surgery*: And wee see *Sage*, or *Betony bruised*, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physitians* call *Errhines*,) put into the Nose, draw Flegme, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume downe by the Pallat. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the Opinion receiued: As *Rubarb* draweth Choller, *Sean* Melancholy; *Agaricke* Flegme; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides Sympathy, betweene the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quicke, draw onely the Lighter, and more fluide Humours; they that draw slow, worke vpon the more Tough, and Viscous Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the Lightest part of the Humour away, and leaueth the Masse of Humours more obstinate. And the like may bee said of *Worme-wood*, which is so much magnified. 38

The fourth *Cause* is *Flatuosity*: For *Wind* stirred moueth to expell: And wee finde that (in effect) all *Purgers* haue in them a raw *Spirit*, or *Winde* which is the Principall *Cause* of *Tortion* in the *Stomacke*, and *Belly*. And therefore *Purgers* leese (most of them) the Vertue, by Decoction vpon the Fire; And for that Cause are giuen chiefly in Infusion, Iuyce, or Powder. 39

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40 The fifth *Cause* is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Spunge*: So wee see that *Taking Cold* moueth Looseneſſe by Contraction of the Skinne, and outward Parts; And ſo doth *Cold* likewiſe cauſe Rheumes, and Defluxions from the Head; And ſome *Aſtringent Plaſters* cruſh out purulent Matter. This kinde of Operation is not found in many *Medicines*: *Mirabolanes* haue it; And it may bee the *Barkes of Peaches*; For this Vertue requireth an *Aſtriction*; but ſuch an *Aſtriction* as is not gratefull to the Body: (For a pleaſing *Aſtriction* doth rather binde in the Humours, than Expell them:) And therefore ſuch *Aſtriction* is found in Things of an Hartiſh Taſte.

41 The Sixth *Cauſe* is *Labrefaction*, and *Relaxation*. As wee ſee in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *Lettuce*, *Mercuriall*, *Pellitory of the Wall*, and others. There is alſo a ſecret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold* relaxeth: As it is ſeene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they bee *Cold*, breake and diſſolue. And by this kinde of *Relaxation*, *Feare* looſeneth the Belly; becauſe the Heat retiring inwards towards the Heart, the Guts and other Parts are relaxed; In the ſame manner, as *Feare* alſo cauſeth Trembling in the Sinewes. And of this Kinde of *Purgers*, are ſome *Medicines* made of *Mercury*.

42 The Seuenth *Cauſe* is *Abſtertion*; which is plainely a *Scouring off*, or *Inciſion* of the *more viſcous Humours*, and making the *Humors* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which ſcoureth Linnen Cloth (ſpeedily) from the Foulenеſſe. But this *Inciſion* muſt bee by a *Sharpneſſe*, without *Aſtriction*; Which wee finde in *Salt*, *Worme-wood*, *Oxymel*, and the like.

43 There bee *Medicines*, that moue *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Thoſe that *Purge by Stoole* are ſuch as enter not at all, or little into the *Meſentery Veines*; But either at the firſt are not digeſtible by the *Stomacke*, and therefore moue immediately downwards to the *Guts*; Or elſe are afterwards reiected by the *Meſentery Veines*, and ſo turne likewiſe downwards to the *Guts*; and of theſe two kindes are moſt *Purgers*. But thoſe that moue *Vrine*, are ſuch, as are well digeſted of the *Stomacke*, and well receiued alſo of the *Meſentery Veines*; So they come as farre as the *Liuer*, which ſendeth *Vrine* to the *Bladder*, as the *Whey* of *Blood*: And thoſe *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liuer*, in ſending downe the wheyey Part of the Blood to the *Reines*. For *Medicines Vrinatiue* doe not worke by Reiection, and Indigeſtion, as *Solutiue* doe.

44 There bee diuers *Medicines*, which in greater *Quantity*, moue *Stoole*, and in ſmaller, *Vrine*: And ſo contrariwiſe, ſome that in greater *Quantity*, moue *Vrine*, and in Smaller, *Stoole*. Of the former ſort is *Rubarb*, and ſome others. The *Cauſe* is, for that *Rubarb* is a *Medicine*, which the Stomacke in a ſmall Quantity doth digeſt, and ouercome, being not Flatuous, nor Loathſome;) and ſo ſendeth it to the *Meſentery Veines*; And ſo being opening, it helpeth downe *Vrine*: But in a greater Quantity, the

the *Stomacke* cannot ouercome it, and so it goeth to the *Guts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort; which being in small *Quantity*. moueth winde in the Stomacke and Guts, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *Winde*; And it selfe getteth to the *Mesentery Veines*; And so to the *Liuer*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments in *Consort* touching *Meats* and *Drinks* that are *most Nourishing*. 45

WEE haue spoken of *Euacuating* of the *Body*; we will now speake something of the *Filling* of it by *Restoratiues* in *Consumptions*, and *Emaciating diseases*. In *Vegetables*, there is one part that is more Nourishing than another; As *Graines*, and *Roots* nourish more, than the *Leaues*; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding Leaues vnable to nourish mans Body. Whether there bee that difference in the Flesh of *Liuing Creatures*, is not well inquired: As whether *Liuers*, and other *Entrailes*, bee not more Nourishing, than the *Outward Flesh*. Wee finde that amongst the *Romans*, a *Gooses Liuer* was a great Delicacy; In so much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceiue that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very *Nourishing Broth*: We finde also that *Scotch Schincke*, (which is a Pottage of strong Nourishment) is made with the *Knees*, and *Sinewes* of *Beefe*: but long boiled: *Ielly* also, which they vse for a Restoratiue, is chiefly made of *Knuckles* of *Veale*. The *Pulpe* that is within the *Crafish* or *Crabb*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crabb* or *Crafish*. The *Yolkes* of *Egges* are clearely more Nourishing than the *Whites*. So that it should seeme, that the Parts of *Liuing Creatures*, that lye more Inwards, nourish more than the Outward Flesh: Except it be the *Braine*; which the Spirit prey too much vpon, to leaue it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in Consumptions, some such thing should bee Deuised, as should bee halfe *Chylus*, before it be put into the Stomacke.

46

Take two large *Capons*; perboile them vpon a soft fire, by the space of an houre, or more, till in effect all the Bloud bee gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good strong Chopping-knife, Mince the two *Capons*, Bones and all, as small as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, sweet, and well seasoned, of foure Gallons of Beere, of 8. *s.* strength, Now as it commeth from the Tunning; Make in the Kilderkin a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawne out in length; Let it steepe in it three Daves, and three Nights, the Bung-hole open, to worke; Then close the Bung-hole, and so let it continue, a Day and a halfe; Then

draw

draw it into Bottles, and you may drinke it well after three dayes Bottelling; And it will laſt ſix weekes (approued.) It drinketh freſh, flowreth and mantleth exceedingly; It drinketh not newiſh at all; It is an excellent Drinke for a Conſumption, to bee drunke either alone, or Carded with ſome other Beere. It quencheth Thirſt, and hath no whit of windineſſe. Note, that it is not poſſible, that Meat and Bread, either in Broths, or taken with Drinke, as is vſed, ſhould get forth into the Veines, and outward Parts, ſo finely, and eaſily, as when it is thus incorporate, and made almoſt a *Chilus* aforehand.

47 Triall would be made of the like Brew with *Potado Roots*, or *Burre Roots* or the *Pith* of *Artichoakes*, which are nouriſhing Meats: It may bee tried alſo, with other fleſh; As *Pheſant*, *Partridge*, *Young Porke*, *Pig*, *Veniſon*, eſpecially of *Young Deere*, &c.

48 A *Mortreſſe* made with the *Brawne* of *Capons*, ſtamped, and ſtrained, and mingled (after it is made) with like quantity, (at the leaſt,) of *Almond Butter*; is an excellent Meat to Nouriſh thoſe that are weake; Better than *Blanck manjar*, or *Jelly*: And ſo is the *Cullice* of *Cockes*, Boiled thicke with the like mixture of *Almond Butter*: For the *Mortreſſe*, or *Cullice*, of it ſelfe, is more Sauoury and ſtrong; and not ſo fit for Nouriſhing of weake Bodies; But the *Almonds* that are not of ſo high a taſte as *Fleſh*, doe excellently qualifie it.

49 *Indian Maiz* hath (of certaine) an excellent Spirit of Nouriſhment: But it muſt bee thorowly boyled, and made into a *Maiz-Creame* like a *Barley Creame*. I iudge the ſame of *Rize*, made into a Creame; For *Rize* is in *Turkey*, and other Countreys of the Eaſt, moſt fed vpon; But it muſt bee thorowly boyled in reſpect of the hardneſſe of it: And alſo becauſe otherwiſe it bindeth the Body too much.

50 *Piſtachoes*, ſo they bee good, and not Muſty, ioyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themſelues, like vnto *Almond Milke*, but more greene, are an excellent Nouriſher. But you ſhall doe well, to adde a little *Ginger*, ſcraped, becauſe they are not without ſome ſubtill windineſſe.

51 *Milke* warme from the Cow, is found to bee a great Nouriſher, and a good Remedy in *Conſumptions*: But then you muſt put into it, when you milke the Cow, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roſes*; For they keepe the *Milke* ſomewhat from Turning, or Crudling in the ſtomacke; And put in Sugar alſo for the ſame cauſe, and partly for the Taſtes ſake; But you muſt drinke a good draught that it may ſtay leſſe time in the Stomacke, leſt it Crudle: And let the Cup into which you milke the Cow, be ſet in a greater Cup of hot Water, that you may take it warme. And *Cow-milke*, thus prepared, I iudge to be better for a *Conſumption*, than *Aſſe-milke*, which (it is true) turneth not ſo eaſily, but it is a little harriſh; Marry it is more proper for Sharpneſſe of Vrine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans Milke* likewiſe is preſcribed, when all faile; but I commend it not; as being a little too neere the Iuyce of

Mans

Mans Body, to be a good Nouriſher; Except it be in *Infants*, to whom it is Naturall.

Oyle of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, 52
ſpread vpon Bread toſted, is an Excellent Nouriſher; But then to keepe the *Oyle* from frying in the Stomacke, you muſt drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomacke too much, you muſt put in a little Powder of Cinnamon.

The *Yolkes* of *Egges* are of themſelues ſo well prepared by Nature for 53
Nouriſhment; As (ſo they bee Potched, or Reare boiled) they need no other Preparation, or Mixture: yet they may bee taken alſo raw, when they are new laid, with *Malmeſey*, or *Sweet Wine*; You ſhall doe well to put in ſome few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, beſides the immediat Faculty of Nouriſhment, ſuch Drinke will ſtrengthen the Backe; So that it will not draw downe the *Vrine* too faſt; For too much *Vrine* doth alwayes hinder Nouriſhment.

Mincing of meat, as in *Pies*, and *Buttered Minced Meat*, ſaueth the Grin- 54
ding of the Teeth; And therefore, (no doubt) it is more Nouriſhing; Eſpecially in Age; Or to them that haue weake Teeth; But the Butter is not ſo proper for weake Bodies; And therefore it were good to moiſten it with a little *Claret Wine*, Pill of *Limon*, or *Orenge*, cut ſmall, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuets*, which are likewiſe minced Meat, in ſtead of Butter, and Fat, it were good to moiſten them, partly with *Creame*, or *Almond*, or *Piſtacho Milke*, or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* wee reſerue to the due place.

Wee haue hitherto handled the Particulars *which yeeld beſt, and eaſieſt, and plentifulleſt Nouriſhment; And now we will ſpeake of the beſt* Meanes *of Conueying, and Conuerting the Nouriſhment.*

The Firſt *Meanes* is, to procure that the *Nouriſhment* may not bee rob- 55
bed, and drawne away; wherein that, which wee haue already ſaid, is very Materiall; To prouide, that the *Reines* draw not too ſtrongly an ouer-great Part of the *Blood* into *Vrine*. To this adde that Precept of *Ariſtotle*, that *Wine* be forborne in all *Conſumptions*; For that the *Spirits* of the *Wine*, doe prey vpon the Roſcide Iuyce of the Body, and inter-common with the Spirits of the Body, and ſo deceiue and rob them of their Nouriſhment. And therefore if the *Conſumption* growing from the weakneſſe of the Stomacke, doe force you to vſe *Wine*; let it alwayes be burnt, that the Quicker Spirits may euaporate; or at the leaſt quenched with two little wedges of Gold, ſix or ſeuen times repeated. Adde alſo this Prouiſion; That there bee not too much *Expence* of the *Nouriſhment*, by *Exhaling* and *Sweating*: And therefore if the Patient be apt to ſweat, it muſt bee gently reſtrained. But chiefly *Hyppocrates* Rule is to bee followed; who aduiſeth quite contrary to that which is in vſe: Namely, that the *Linnen*, or *Garment* next the Fleſh, bee in Winter drie, and oft changed;

changed; And in Sommer ſeldome changed, and ſmeared ouer with Oyle; For certaine it is, that any Subſtance that is Fat, doth a little fill the Proes of the Body, and ſtay Sweat, in ſome Degree. But the more cleanly way is to haue the *Linnen* ſmeared lightly ouer, with *Oyle* of *Sweet Almonds*; And not to forbeare ſhifting as oft as is fit.

56 The ſecond *Meanes* is, to ſend forth the *Nouriſhment* into the *Parts*, more ſtrongly; For which, the working muſt bee by *Strengthening* of the *Stomack*; And in this, becauſe the *Stomacke* is chiefly comforted by *Wine*, and *Hot things*, which otherwiſe hurt; it is good to reſort to *Outward Applications* to the *Stomacke*: Wherein it hath beene tried, that the *Quilts* of *Roſes*, *Spices*, *Maſticke*, *Worme-wood*, *Mint*, &c. are nothing ſo helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sacke*, or *Alegant*; And to dry it; And after it bee dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomacke: For it is certaine that all Flower hath a potent Vertue of *Aſtriction*; In ſo much as it hardneth a peece of fleſh, or a Flower, that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewiſe very good; but it drieth ſomewhat too much; And therefore it muſt not lye long.

57 The third *Meanes*, (which may bee a Branch of the former) is to ſend forth the *Nouriſhment* the better by *Sleepe*. For wee ſee, that Beares, and other *Creatures* that *Sleepe* in the Winter wax exceeding Fat: And certaine it is, (as it is commonly beleeued) that *Sleepe* doth Nouriſh much; Both for that the Spirits doe leſſe ſpend the Nouriſhment in *Sleepe*, than when liuing *Creatures* are awake: And becauſe (that which is to the preſent purpoſe) it helpeth to thruſt out the Nouriſhment into the Parts. Therefore in Aged men, and weake Bodies, and ſuch as abound not with Choller, a ſhort *Sleepe* after dinner doth helpe to Nouriſh; For in ſuch Bodies there is no feare of an ouer-haſty Diſgeſtion, which is the Inconuenience of Poſtmeridian *Sleepes*. *Sleepe* alſo in the Morning, after the taking of ſomewhat of eaſie Digeſtion; As *Milke* from the Cow, *Nouriſhing Broth*, or the like; doth further Nouriſhment: But this would be done, ſitting vpright, that the *Milke* or *Broth* may paſſe the more ſpeedily to the Bottome of the Stomacke.

58 The Fourth *Meanes* is to prouide that the Parts themſelues may draw to them the Nouriſhment ſtrongly. There is an Excellent Obſeruation of *Ariſtotle*; That a great Reaſon, why Plants (ſome of them) are of greater Age, than *Liuing Creatures*, is, for that they yearely put forth new Leaues and Boughes; Whereas *Liuing Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes which are Excrements, and no Parts. And it is moſt certaine, that whatſoeuer is Young, doth draw Nouriſhment better, than that which is Old; And then (that which is the Myſtery of that Obſeruation) Young *Boughes*, and *Leaues*; calling the Sap vp to them; the ſame Nouriſheth the *Body*, in the Paſſage. And this wee ſee notably proued alſo, in that the oft Cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Laſting. Transferre therefore this Obſeruation to the

Helping

Helping of Nouriſhment in *Liuing Creatures*: The Nobleſt and Principall Vſe whereof is, for the *Prolongation* of *Life*; *Reſtauration* of ſome Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Liuing Creatures* Parts that Nouriſh, and repaire Eaſily; And Parts that Nouriſh and repaire hardly, And you muſt refreſh, and renew thoſe that are eaſie to Nouriſh, that the other may bee refreſhed, and (as it were) Drinke in Nouriſhment in the Paſſage. Now we ſee that *Draught Oxen*, put into good Paſture, recouer the Fleſh of young Beeſe; And Men after long Emaciating Diets, wax plumpe, and fat, and almoſt New: So that you may ſurely conclude, that the frequent and wiſe Vſe of thoſe *Emaciating Diets*, and of *Purgings*: And perhaps of ſome kinde of *Bleeding*; is a principall Meanes of *Prolongation* of *Life*; And *Reſtoring* ſome Degree of *Youth*: For as we haue often ſaid, *Death* commeth vpon *Liuing Creatures* like the Torment of *Mezentius*.

Mortua quinetiam iungebat Corpora viuis.
Componens Manibuſq; Manus, atq; Oribus Ora.

For the Parts in Mans Body eaſily reparable (as *Spirits*, *Blood*, and *Fleſh*) die in the Embracement of the Parts hardly reparable (as *Bones*, *Nerues*, and *Membranes*;) and likewiſe ſome *Entrailes* (which they reckon amongſt the *Spermaticall Parts*) are hard to repaire: though that Diuiſion of *Spermatecall*, and *Menſtruall Parts*, be but a Conceit. And this ſame *Obſeruation* alſo may be drawne to the preſent purpoſe of Nouriſhing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nouriſhment, by making the Parts a little hungry, and heating them; whereby they call forth Nouriſhment the better. This *Frication* I wiſh to bee done in the Morning. It is alſo beſt done by the *Hand*, or a peece of *Scarlet Wooll*, wet a little with *Oyle* of *Almonds*, mingled with a ſmall Quantity of *Bay-ſalt*, or *Saffron*. We ſee that the very Currying of Horſes doth make them fat, and in good liking.

The Fifth *Meanes* is, to further the very *Act* of *Aſſimilation* of *Nouriſhment*; which is done by ſome outward *Emollients*, that make the Parts more apt to *Aſſimilate*. For which I haue compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The vſe of it would bee betweene Sleepes; For in the latter Sleepe the Parts aſſimilate chiefly. 59

THere bee many *Medicines*, which by themſelues would doe no Cure, but perhaps Hurt, But being applied in a certaine Order, one after another, doe great Cures. I haue tried (my ſelfe) a *Remedy* for the *Gout*, which hath ſeldome failed, but driuen it away in 24. Houres ſpace: It is firſt to apply a *Pultaſſe*, of which *vide* the *Receit*; And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaiſter*, *vide* the *Receit*. The *Pultaſſe* relaxeth the Pores, and maketh the Humour apt to Exhale The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pultaſſe*, draweth gently; And therefore draweth the Humour out; and doth not draw more to it; For it Experiment Solitary touching *Filum Medicinale*. 60

is a *Gentle Fomentation*, and hath withall a Mixture (though very little) of some *Stupefactiue*. The *Plaister* is a Moderate *Astrigent Plaister*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; if too strong, it would draw to the Part, as well as draw from it. The *Plaister* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to be laid to for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being vsed hot, and seuen or eight times repeated: The *Plaister* to continue on still, till the Part be well confirmed.

Experiment Solitary touching *Cure by Custome*. 61

THere is a secret Way of *Cure* (vnpractised;) By *Assuetude* of that which in it selfe hurteth. *Poisons* haue been made, by some, Familiar, as hath beene said; *Ordinary keepers* of the *Sicke* of the *Plague*, are seldome infected. *Enduring* of *Torture*, by *Custome*, hath beene made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drinke*, hath beene, by *Custome*, made to bee without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palseyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Iust Cure of it bee not full of perill; And if hee finde it to be such, let him resort to *Palliation*; And alleuiate the *Symptome*, without busying himselfe too much with the perfect *Cure*: And many times, (if the *Patient* bee indeed patient) that Course will exceed all Expectation. Likewise the *Patient* himselfe may striue, by little and little to Ouercome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment Solitary touching *Cure by Excesse*. 62

DIuers *Diseases*, especially *Chronicall* (such as *Quartan Agues*;) are sometimes cured by *Surfet*, and *Excesses*; As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an Aduentitious Strength from Custome, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them onely to their first *Cause*; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment Solitary touching *Cure* by *Motion* of *Consent*. 63

THere is in the Body of Man a great *Consent* in the *Motion* of the seuerall Parts. Wee see, it is Childrens sport, to proue whether they can rub vpon their Breast with one hand, and pat vpon their Fore-head with another; And straight-wayes, they shall sometimes rub with both Hands, or pat with both Hands. Wee see, that when the Spirits, that come to the Nosthrils, expell a bad Sent, the Stomacke is ready to Expell

pell by Vomit. We finde that in *Conſumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Peſtilent Diſeaſes*, if they cannot bee expelled by *Sweat*, they fall likewiſe into *Looſeneſſe*, and that is commonly Mortall. Therefore *Phyſitians* ſhould ingeniouſly contriue, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Conſent*; As by the *Stench* of *Feathers*, or the like, they cure the *Riſing* of the *Mother*.

Experiment Solitary touching *Cure of Diſeaſes which are contrary to Predispoſition.* 64

Hippocrates Aphoriſme, In *Morbis minus*, is a good profound *Aphoriſme*, It importeth, that *Diſeaſes*, contrary to the *Complexion*, *Age*, *Sex*, *Seaſon of the yeare*, *Diet*, &c. are more dangerous, than thoſe that are Concurrent. A man would thinke it ſhould bee otherwiſe, For that, when the *Accident of Sickneſſe*, and the *Naturall Diſpoſition*, doe ſecond the one the other, the *Diſeaſe* ſhould bee more forcible: And ſo (no doubt) it is; if you ſuppoſe like *Quantity of Matter*. But that, which maketh good the *Aphoriſme*, is; Becauſe ſuch *Diſeaſes* doe ſhew a greater *Collection of Matter*, by that they are able to ouercome thoſe *Naturall Inclinations* to the Contrary. And therefore in *Diſeaſes* of that kinde, let the *Phyſition* apply himſelfe more to *Purgation*, than to *Alteration*; Becauſe the Offence is in the *Quantity*; and the *Qualities* are rectified of themſelues.

Experiment Solitary touching *Preparations* before *Purging*, and *ſetting* of the *Body* afterward. 65

Phyſitians doe wiſely preſcribe, that there bee *Preparatiues* vſed before *Iuſt Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire away; Which cauſeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And alſo, the diminiſhing, and dulling of the Working of the *Medicine* it ſelfe, that it purgeth not ſufficiently. Therefore the worke of *Preparation* is double; To make the *Humours Fluide*, and mature; And to make the *Paſſages* more open; For both thoſe helpe to make the Humours paſſe readily. And for the former of theſe; *Sirrups* are moſt profitable, And for the Latter, *Apozumes*, or *Preparing Broths*; *Cliſters* alſo helpe, leſt the *Medicine* ſtop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*, And *Fat Bodies*; And *Open weather*; are *Preparatiues* in themſelues; becauſe they make the Humours more fluide. But let a *Phyſitian* beware, how hee purge after hard *Froſty weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is cauſed by the *Lodging* of ſome *Humours* in *ill Places*: For it is certaine, that there bee *Humours*, which ſomewhere placed in the Body, are quiet, and doe little hurt; In other Places (eſpecially Paſſages) doe much miſchiefe. Therefore it is good, after *Purging*, to vſe *Apozumes*, and *Broths*, not ſo much *Opening* as thoſe vſed before *Purging*, but *Abſterſiue* and

Mundifying Cliſters alſo are good to conclude with, to draw away the Reliques of the Humours, that may haue deſcended to the *Lower Region* of the *Body*.

Experiment Solitary touching *Stanching of Blood.* 66

BLoud is ſtanched diuers wayes. Firſt, by *Aſtringents*, and *Repercuſſiue Medicines*. Secondly, by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *Cold*; As *Iron*, or a *Stone* laid to the necke doth ſtanch the Bleeding at the Noſe; Alſo it hath beene tried, that the *Teſticles*, being put into ſharpe Vinegar, hath made a ſudden Receſſe of the Spirits, and ſtanched Bloud. Thirdly, by the *Receſſe of the Bloud by Sympathy*. So it hath beene tried, that the part that bleedeth, being thruſt into the Body of a Capon, or Sheepe, new ript and bleeding, hath ſtanched *Bloud*; The *Bloud*, as it ſeemeth, ſucking and drawing vp, by ſimilitude of ſubſtance, the *Bloud* it meeth with, and ſo it ſelfe going backe. Fourthly by Cuſtome and Time; So the Prince of *Aurange*, in his firſt hurt, by the *Spaniſh Boy*, could finde no meanes to ſtanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to haue the *Orifice* of the *Wound* ſtopped by *Mens Thumbs*, ſucceeding one another, for the ſpace at leaſt of two Dayes; And at the laſt the bloud by *Cuſtome* only retired. There is a fifth Way alſo in vſe, to let *Bloud* in an *Aduerſe Part*, for a *Reuulſion*.

Experiment Solitary touching *Change of Aliments* and *Medicines.* 67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the ſame *Medicine*, and *Aliment* ſtill. The Cauſe is, for that *Nature* by continuall Vſe of any Thing, groweth to a *Saciety*, and *Dulneſſe*, either of *Appetite*, or *Working*. And we ſee that *Aſſuetude* of *Things Hurtfull* doth make them leeſe their force to Hurt; As *Poiſon*, which with vſe ſome haue brought themſelues to brooke. And therefore it is no maruell, though *Things helpfull*, by *Cuſtome*, leeſe their force to helpe. I count *Intermiſſion* almoſt the ſame thing with *Change*; For that, that hath beene intermitted, is after a ſort new.

Experiment Solitary touching *Diets.* 68

IT is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (eſpecially if they bee ſtrict) the *Patient* is more troubled in the beginning, than after continuance; which hath made ſome of the more delicate Sort of Patients, giue them ouer in the middeſt; Suppoſing that if thoſe Diets trouble them ſo much at firſt, they ſhall not be able to endure them to the End. But the Cauſe is, for that all thoſe *Diets* doe dry vp *Humours*, *Rheumes*, and the like; And they cannot Dry vp vntill they haue firſt attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, vntill it bee dried vp, and conſumed. And therefore *Patients* muſt expect a due time, and not checke at them at the firſt.

Experiments in Conſort touching the *Production* of *Cold.*

The *Producing* of *Cold* is a thing very worthy the Inquiſition; both for Vſe, and Diſcloſure of Cauſes. For *Heat* and

Cold

Cold are *Natures* two Hands, whereby ſhee chiefly worketh: And *Heat* we haue in readineſſe, in reſpect of the *Fire*; But for *Cold* wee muſt ſtay till it commeth; or ſeeke it in deepe Caues, or high Mountaines, And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, than a *Summers Sunne*; But *Vaults*, or *Hils* are not much Colder than a *Winters Froſt*.

69 The firſt *Meanes* of *Producing Cold*, is that which *Nature* preſenteth vs withall; Namely the *Expiring of Cold* out of the *Inward parts of the Earth* in *winter*, when the Sunne hath no power to ouercome it; the *Earth* being (as hath beene noted by ſome) *Primum Frigidum*. This hath beene aſſerted as well by Ancient as by Moderne *Philoſophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the diſcourſe in *Plutarch* (for I take it that Booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Teleſius*, who hath renewed the *Philoſophy* of *Parmenides*, and is the beſt of the *Nouelliſts*.

70 The Second *Cauſe* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is Actiue and Tranſitiue into Bodies Adiacent, as well as *Heat*: which is ſeene in thoſe things that are touched with *Snow* or *Cold water*. And therefore whoſoeuer will be an *Inquirer* into *Nature*, let him reſort to a *Conſeruatory* of *Snow* and *Ice*; Such as they *vſe for delicacy*, to coole Wine in Summer: which is a Poore and Contemptible vſe, in reſpect of other vſes, that may be made of ſuch *Conſeruatories*.

71 The Third *Cauſe* is the *Primary Nature* of all *Tangible bodies*: For it is well to bee noted, that all Things whatſoeuer *(Tangible)* are of themſelues *Cold*; Except they haue an Acceſſory *Heat* by *fire*; *Life*; or *Motion*: For euen the *Spirit* of *wine*, or *Chymicall Oiles*, which are ſo hot in Operation, are to the firſt Touch *Cold*; And *Aire* it ſelfe compreſſed, and Condenſed a little by blowing, is *Cold*.

72 The Fourth *Cauſe* is the *Denſity of the Body*; For all *Denſe Bodies* are *Colder* than moſt other *Bodies*; As *Metalls*, *Stone*, *Glaſſe*; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Denſe*, *Tangible*, hold all of the Nature of *Cold*. The Cauſe is, for that all *Matters Tangible* being *Cold*, it muſt needs follow, that where the *Matter* is moſt Congregate, the *Cold* is the greater.

73 The Fifth *Cauſe* of *Cold*, or rather of increaſe and vehemence of *Cold*, is a *Quicke Spirit incloſed in a Cold Body*: As will appeare to any that ſhall attentiuely conſider of *Nature* in many Inſtances. Wee ſee *Nitre* (which hath a *Quicke Spirit)* is Cold; more *Cold* to the Tongue, than a Stone; So *Water* is *Colder* than *Oile*, becauſe it hath a *Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digeſted than *Water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *Water*, becauſe it hath *more Spirit* within it: So we ſee that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice)* increaſeth the *Actiuity* of *Cold*: So ſome *Inſects* which haue

Spirit of *Life*, as *Snakes*, and *Silkewormes*, are, to the touch *Cold*. So *Quick-siluer* is the *Coldest* of Mettals, because it is *fullest of Spirit*.

74 The Sixth *Cause* of *Cold* is *the Chasing and Driuing away of Spirits*, such as haue some *Degree of Heat*: For the Banishing of the *Heat* must needs leaue any Body *Cold*. This wee see in the Operation of *Opium*, and *Stupefactiues*, vpon the Spirits of liuing Creatures: And it were not amisse to try *Opium*, by laying it vpon the Top of a *weather-Glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the Vertue of *Opium* will hardly penetrate thorow such a Body as Glasse, I conceiue that *Opium*, and the like, make the *Spirits* flye rather by *Malignity*, than by *Cold*.

75 Seuenthly, the same *Effect* must follow vpon the *Exhaling* or *Drawing out of the Warme Spirits*, that doth vpon the Flight of the Spirits. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sunne* is of *Cold* and *Moisture*: It were not amisse therefore to try it, with *Warme-waters*; The one exposed to the Beames of the *Moone*; the other with some Skreene betwixt the Beames of the *Moone* and the *Water*; As wee vse to the *Sunne* for Shade; And to see whether the former will coole sooner. And it were also good to enquire, what other Meanes there may bee, to draw forth the *Exile Heat*, which is in the *Aire*; for that may be a Secret of great Power to Produce *Cold Weather*.

Experiments in Consort touching the *Version* and *Transmutation of Aire into Water*.

Wee haue formerly set downe the *Meanes of turning Aire into water*, in the *Experiment* 27. But because it is *Magnale Naturæ*; And tendeth to the subduing of a very great effect; And is also of Manifold vse; wee will adde some *Instances in Consort* that giue light thereunto.

76 It is reported by some of the *Ancients*, that *Sailers* haue vsed, euery Night, to hang *Fleeces of Woolle* on the sides of their *Ships*, the *Woolle* towards the water; And that they haue crushed fresh Water out of them, in the Morning, for their vse. And thus much we haue tried, that a *Quantity* of *Woolle* tied loose together, being let downe into a deepe *well*; And hanging in the *Middle*, some three Fathome from the Water, for a night, in the Winter time; increased in weight, (as I now remember) to a fifth Part.

77 It is reported by one of the *Ancients*, that in *Lydia*. neere *Pergamus*, there were certaine *worke-men*, in time of *Warres*, fled into *Caues*; And the Mouth of the *Caues* being stopped by the Enemies, they were famished. But long time after the dead Bones were found; And some Vessels which they had carried with them; And the Vessels full of *Water*; And that *water*, thicker, and more towards Ice, than Common *Water*: which is a Notable Instance of *Condensation*, and *Induration*, by *Buriall vnder Earth*, (in Caues) for long time; And of *version* also (as it should seeme) of *Aire* into *Water*; if any of those Vessels were Empty. Try therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-siluer*: And if you finde the *Bladders* fallen, or shrunke; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would be in a *Caue* vnder *Earth*.

It is reported of very good credit, that in the *East Indies*, if you set a Tub of *Water* open, in a Roome where *Cloues* are kept, it will bee drawne dry in foure and twenty houres; Though it stand at some distance from the *Cloues*. In the Countrey, they vse many times, in deceit, when their *Wooll* is new shorne, to set some Pailes of *water* by, in the same Roome; to increase the weight of the *Wooll*: But it may bee, that the Heat of the *Wooll*, remaining from the body of the Sheepe; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*. 78

It is reported also credibly, that *Wooll* new shorne, being laid casually vpon a *Vessell* of *Veriuyce*, after some time, had drunke vp a great part of the *Veriuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this instance, there is (vpon the by) to be noted the *Percolation*, or *Suing* of the *Veriuyce* thorow the wood; For *Veriuyce* of it selfe would neuer haue passed thorow the Wood; So as it seemeth, it must be first in a kinde of Vapour, before it passe. 79

It is especially to bee noted, that the Cause, that doth facilitate the *Version* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* haue an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neere them, they will draw it: And after they haue drawne it, they will condense it more and in effect incorporate it; For wee see that a *Spunge*, or *wooll*, or *Sugar*, or a *woollen Cloth*, being put but in part, in *water*, or *wine*, will draw the *Liquor* higher, and beyond the place, where the *water* or *wine* commeth. Wee see also, that *wood*, *Lute-strings*, and the like, doe swell in *moist Seasons*: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth of Boxes*, and *Opening* of *wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to smell: As wee see in the Filling of the Chops of Boules, by laying them in Water. But for that part of these *Experiments*, which concerneth *Attraction*; wee will reserue it to the proper *Title* of *Attraction*. 80

There is also a *Version of Aire into Water*, seene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist Aire thickned against the hard body. But it is plaine, that it is the latter; For that wee see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse: which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. Wee see also, that *Breathing* vpon a *Glasse*, or Smooth body, giueth a Dew. And in *Frosty Mornings* (such as we call *Rime Frosts*) you shall finde drops of Dew vpon 81

the

the Inside of Glasse-windowes; And the *Frost* it selfe vpon the ground is but a *Version* or *Condensation*, of the Moist Vapours of the Night, into a watrie substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist Vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

82 It is is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer vnto *Water*. Therefore try the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we shall speake in another place) with *Aire* in place of *Water* and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall *Conversion* of *water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments in Consort touching *Induration of Bodies.*

Induration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The effecting and Accelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And vpon that, the more grosse of the Tangible Parts doe contract and serre themselues together; Both to auoid *Vacuum* (as they call it;) And also to Munite themselues against the Force of the *Fire*, which they haue suffered. And the third is by *Assimilation*; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Mineralls*, which come (no doubt) at first, of Iuyces Concrete, which afterward indurate: And so of *Porcellane*, Which is an *Artificiall Cement*, buried in the earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden

den with time : Alſo the *Induration* of *Bead-Amber*, which at firſt is a ſoft Subſtance ; as appeareth by the *Flies*, and *Spiders*, which are found in it ; And many more : But We will ſpeake of them diſtinctly.

For *Indurations* by *Cold*, there be few Trials of it ; For we haue no ſtrong, or intenſe *Cold* here on the Surface of the *Earth*, ſo neere the Beames of the Sunne, and the Heauens. The likelieſt Triall is by *Snow*, and *Ice* ; For as *Snow* and *Ice*, eſpecially being holpen, and their *Cold* actiuated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres ; So it may bee, it will turne *Wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conſeruing Pit* of *Snow*, and *Ice*, (adding ſome quantity of *Salt*, and *Nitre*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more. 83

Another Triall is by *Metalline waters*, which haue vertuall *Cold* in them. Put therefore *Wood*, or *Clay*, into *Smiths Water*, or other *Metalline Water* ; And try whether it will not harden in ſome reaſonable time. But I vnderſtand it, of *Metalline waters*, that come by Waſhing, or Quenching ; And not of *Strong waters* that come by diſſolution ; for they are too Coroſiue to conſolidate. 84

It is already found, that there are ſome *Naturall Spring-waters*, that will Inlapidate *Wood* ; So as you ſhall ſee one peece of *Wood*, whereof the Part aboue the *Water* ſhall continue *Wood* ; and the Part vnder the *Water* ſhall be turned into a kinde of *Grauelly Stone* ; It is likely thoſe *Waters* are of ſome *Metalline Mixture* ; But there would bee more particular inquiry made of them. It is certaine that an *Egge* was found, hauing lien many yeares in the bottome of a Moat, where the Earth had ſomewhat ouergrowne it ; And this Egge was come to the Hardneſſe of a *Stone* ; And had the Colours of the white and yolke perfect : And the Shell ſhining in ſmall graines like Sugar, or Alablaſter. 85

Another Experience there is of *Induration* by *Cold*, which is already found ; which is, that *Metalls*, themſelues are hardned by often *Heating* and *Quenching* in *Cold Water* : For *Cold* euer worketh moſt potently vpon *Heat* precedent. 86

For *Induration* by *Heat*, it muſt be conſidered, that *Heat*, by the Exhaling of the Moiſter Parts, doth either harden the Body ; As in *Bricks*, *Tiles*, &c. Or if the *Heat* bee more fierce, maketh the groſſer part it ſelfe ; Run and Melt ; As in the making of ordinary *Glaſſe* ; And in the *Vitrification* of *Earth*, (As wee ſee in the inner Parts of *Furnaces* ;) and in the *Vitrification* of *Brick* ; And of *Metalls*. And in the former of theſe, which is the hardning by baking, without Melting, the *Heat* hath theſe degrees ; Firſt, it *Induratch* ; And then maketh *Fragile* ; And laſtly it doth *Incinerate* and *Calcinate*. 87

But if you deſire to make an *Induration* with *Toughneſſe*, and leſſe Fragility ; A middle way would be taken ; Which is that which *Ariſtotle* hath well noted ; But would bee throughly verified. It is to decoct *Bodies*

in

in *Water*, for two or three dayes; But they must bee such Bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* will enter, then long Seething, will rather Soften than indurate them. As hath beene tried in *Eggs*, &c. Therefore, Softer *Bodies* must be put into Bottles; And the Bottles hung into Water seething, with the mouthes open, aboue the *Water*; that no *Water* may get in; For by this Meanes, the vertuall *Heat* of the *Water* will enter; And such a *Heat*, as will not make the Body aduſt, or fragile; But the Substance of the *Water* will be shut out. This *Experiment* wee made; And it sorted thus. It was tried with a Peece of *Free-stone*, and with *Pewter*, put into the *Water* at large. The *Free-stone* wee found receiued in some *Water*; For it was softer, and easier to scrape, than a peece of the same *Stone* kept dry. But the *Pewter* into which no *Water* could enter, became more white, and liker to Siluer, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, and a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*. The *Cheese* likewise very hard, and not well to bee cut: The *Chalke* and the *Free-stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to White, as in ordinary Drying by the Sunne. Note, that all the former Trialls were made by a Boyling vpon a good hot Fire, renewing the *Water* as it consumed, with other hot *Water*; But the Boyling was but for twelue houres onely; And it is like that the Experiment would haue beene more effectuall, if the Boyling had beene for two or three dayes, as we prescribed before.

89 As touching *Assimilation*, (for there is a degree of *Assimilation* euen in Inanimate Bodies) wee see examples of it in some *Stones* in *Clay-grounds*, lying neere to the top of the Earth, where *Pebble* is; In which you may manifestly see diuers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselues: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it diuers *Pebble-stones*, thicke set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. We see also in Ruines of old Walls, especially towards the Bottome, the *Morter* will become as hard as the *Bricke*; wee see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *Wood* it selfe; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselues.

90 Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees* and *Liuing Creatures:* For no Nourishment that the *Tree* receiueth, or that the *Liuing Creature* receiueth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment Solitary touching the *Version of Water into Aire.*

91 THe eye of the vnderstanding, is like the eye of the Sense: For as you may see great Obiects thorow small Crannies, or Leuells; So you

may

may ſee great *Axiomes* of *Nature*, through ſmall and Contemptible *Inſtances*. The *Speedy Depredation* of *Aire* vpon *Watry Moiſture*, and *Verſion* of the ſame into *Aire*, appeareth in nothing more viſible than in the ſudden Diſcharge, or vaniſhing, of a little *Cloud* of *Breath*, or *Vapour* from *Glaſſe* or the *Blade* of a *Sword*, or any ſuch Poliſhed Body; Such as doth not at all Detaine, or Imbibe the Moiſture; For the Miſtineſſe ſcattereth and breaketh vp ſuddenly. But the like *Cloud*, if it were *Oyly*, or *Fatty*, will not diſcharge; Not becauſe it ſticketh faſter; But becauſe *Aire* preyeth vpon *Water*; And *Flame*, and *Fire*, vpon *Oyle*; And therefore, to take out a Spot of Greaſe, they vſe a *Coale* vpon browne Paper; becauſe *Fire* worketh vpon Greaſe, or *Oyle*, as *Aire* doth vpon *Water*. And we ſee *Paper oyled* or *Wood oyled*, or the like, laſt long moiſt: but *wet* with *Water*, dry, or putrifie ſooner. The Cauſe is, for that *Aire* medleth little with the *Moiſture* of *Oyle*.

Experiment Solitary touching the *Force of Vnion*. 92

THere is an Admirable demonſtration, in the ſame trifling *Inſtance* of the *Little Cloud* vpon *Glaſſe*, or *Gemmes*, or *Blades* of *Swords*, of the *Force* of *Vnion*, euen in the leaſt Quantities, and weakeſt Bodies, how much it conduceth to Preſeruation of the preſent Forme; And the Reſiſting of a New. For marke well the Diſcharge of that *Cloud*; And you ſhall ſee it euer breake vp, firſt in the Skirts, and laſt in the middeſt. Wee ſee likewiſe, that much *water* draweth forth the Iuyce of the Body Infuſed; But little water, is imbibed by the Body: And this is a Principall Cauſe, why in Operation vpon *Bodies*, for their *Verſion* or *Alteration*, the Triall in great Quantities, doth not anſwer the Triall in ſmall; And ſo deceiueth many; For that (I ſay) the greater Body, reſiſteth more any Alteration of Forme, and requireth farre greater Strength in the Actiue Body, that ſhould ſubdue it.

Experiment Solitary touching the *Producing of Feathers and Haires of diuers Colours*. 93

WE haue ſpoken before in the fifth *Inſtance*, of the Cauſe of *Orient Colours*, in *Birds*; which is by the Fineneſſe of the Strainer: we will now endeuour to reduce the ſame *Axiome* to a *Worke*. For this Writing of our *Siluæ Siluarum*, is (to ſpeake properly) not *Naturall Hiſtory*, but a high kinde of *Naturall Magicke*. For it is not a Deſcription onely of Nature, but a Breaking of Nature, into great and ſtrange Workes. Try therefore, the Anointing ouer of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelpes*, cutting their Haire as ſhort as may bee; Or of ſome other Beaſt; with ſome oyntment, that is not hurtfull to the Fleſh; And that will harden, and ſticke very cloſe; And ſee whether it will not alter the Colours of the *Feathers*, or *Haire*. It is receiued, that the *Pulling* off, the firſt *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *white* is a penurious Colour, and where Moiſture is ſcant. So *Blew Violets*, and other *Flowers*, if they bee ſtarued, turne Pale and *White*; *Birds*, and *Horſes*, by Age, or Scarres, turne *White*; And the *Hoare Haires* of Men; come by the ſame reaſon. And therefore in *Birds*, it is very likely, that the *Feathers* that come

come first, will bee many times of diuers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not only for the producing of *Birds*, and *Beasts* of strange Colours; but also for the Disclosure of the Nature of *Colours* themselues; which of them require a finer Porosity, and which a grosser.

Experiment Solitary touching the *Nourishment of Liuing Creatures before they bee brought forth.*

94

IT is a worke of Prouidence, that hath beene truly obserued by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* bee opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe; haue in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and seuered from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; but onely a quickning *Heat* when she sitteth. But Beasts, and Men need not the matter of Nourishment within themselues; because they are shaped within the Wombe of the Female; and are nourished continually from her Body.

Experiments in Consort touching *Sympathy and Antipathy for Medicinall vse.*

95

IT is an Inueterate and receiued Opinion, that *Cantharides* applied to any part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Receiued, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to moue Grauell, and to dissolue the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe Grauell, as Men haue beene glad to remoue it; It was so violent.

96 It is receiued and confirmed by daily Experience, that the *Soales* of the *Feet* haue great Affinity with the *Head*, and the *Mouth* of the *Stomacke*: As we see, *Going wet-shod.* to those that vse it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after dry the *Rheume*: And therefore a *Physitian*, that would bee Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually vpon a *Camomill Alley*; Meaning that hee should put *Camomill* within his Sockes. Likewise *Pigeons Bleeding*, applied to the *Soales* of the *Feet*, ease the *Head*. And *Soporiferous Medicines* applied vnto them, prouoke *Sleepe*.

97 It seemeth, that as the *Feet* haue a Sympathy with the *Head*; So the *Wrests* and *Hands*, haue a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*; And it is often tried, that Iuyces of *Stock Gilli-flowers*, *Rose Campian*, *Garlicke*, and other things; applyed to the *Wrests*, and renewed; haue cured long *Agues*. And I conceiue, that washing with certaine *Liquors*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands *Egges of Alablaster*, and *Bals* of *Crystall*.

Of these things we shall speake more, when we handle the Title *of* Sympathy *and* Antipathy, *in the proper Place.*

The

Experiment Solitary touching the Secret Processes of Nature. 98

The Knowledge of Man (hitherto) hath beene determined by the View, or Sight; So that whatsoeuer is Inuisible, either in respect of the *Fineneſſe of the Body* it selfe; Or the *Smalneſſe of the Parts*; Or of the *Subtilty of the Motion*; is little inquired. And yet these bee the Things that Gouerne Nature principally; And without which, you cannot make any true *Analyſis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Actiue of Bodies. Sometimes they take them for *Aire*, From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will haue them to bee *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are Crude and Cold. And sometimes they will haue them to bee the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselues. And then, when they come to Plants and liuing Creatures, they call them *Soules*. And such Superficiall Speculations they haue, Like Prospectiues, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoeuer, more or lesse; And they are neuer (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vinification*, and most of the Effects of *Nature*: For, as wee haue figured them in our *Sapientia Veterum*, in the *Fable* of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits*, doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath giuen some light, in discerning by their Separations, the *Oyly*, *Crude*, *Pure*, *Impure*, *Fine*, *Grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs*, and *Drugs* haue diuers Parts; As that *Opium* hath a Stupefactiue Part, and a Heating Part; The one mouing Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts of Bodies*, which doe so great Effects, they haue not beene obserued at all, because they are Inuisible, and incurre not to the Eye; but yet they are to bee deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiæ esse conuincitur: Atomum enim nemo vequam vidit.* And therefore the Tumult in the Parts of Solid Bodies, when they are compressed, which is the Cause of all

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall bee throughly handled in due place) is not seene at all. But neuertheleſſe, if you know it not, or enquire it not attentiuely and diligently, you ſhall neuer bee able to diſcerne, and much leſſe to produce a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the Effects (which were mentioned before) paſſe betweene the *Spirits*, and the *Tangible Parts*; (whieh are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *&c.*) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Paſſions*, and ſuch other *Logicall* Words.

Experiment Solitary touching the *Power of Heat*, 96

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt aduanced, when it worketh vpon a Body, without loſſe or diſſipation of the Matter; for that euer betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceiued in *Diſtillations*, which are performed in cloſe Veſſells, and Receptacles. But yet there is a higher Degree; For howſoeuer *Diſtillations* doe keepe the Body in Cels, and Cloiſters, without Going abroad; yet they giue ſpace vnto Bodies to turne into Vapour; To returne into Liquor; and to Seperate one part from another. So as Nature doth Expatiate, although it hath not full Liberty whereby the true and Vltime Operations of *Heat* are not attained. But if Bodies may bee altered by *Heat*, and yet no ſuch Reciproc ation of *Rarefaction*, and of *Condenſation*, and of *Separation*, admitted; t'en it is like that this *Proteus* of *Matter*, being held by the Sleeues, will turne and change into many *Metamorphoſes*. Take therefore a *Square Veſſell* of *Iron*, in forme of a Cube, and let it haue good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it haue a Couer of Iron, as ſtrong (at leaſt) as the Sides; And let it bee well Luted, after the manner of the *Chymiſts*. Then place the *Veſſell* within burning *Coales*, kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Couer, and ſee what is become of the *Wood*. I conceiue that ſince all *Inflammation*, and *Euaporation* are vtterly prohibited, and the *Body* ſtill turned vpon it ſelfe; that one of theſe two effects will follow: Either that the *Body* of the *Wood* will bee turned into a kinde of *Amalgma*, (as the *Chymiſts* call it;) Or that the Finer Part will bee turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate vpon the Sides of the *Veſſell*, being become of a Denſer Matter, than the *Wood* it ſelfe, Crude. And for another Triall, take alſo *Water*, and put it in the like Veſſell, ſtopped as before, But vſe a gentler *Heat*, and remoue the Veſſell ſometimes from the Fire; And againe, after ſome ſmall time when it is Cold, renue the *Heating* of it: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *Water*, which is one of the Simpleſt of Bodies, bee changed in Colour, Odour, or Taſte

after the manner of Compound Bodies, you may bee ſure that there is a great Worke wrought in Nature, and a notable Entrance made into ſtrange Changes of Bodies, and productions: And alſo a Way made to doe that by Fire, in ſmall time, which the Sun and Age doe in long time. But of the Admirable Effects of this *Diſtillation in Cloſe*, (for ſo wee will call it) which is like the *Wombs* and *Matrices* of liuing creatures, where nothing Expireth, nor Separateth; We will ſpeake fully, in the due place; Not that we Aime at the making of *Paracelſus Pigmey's*; Or any ſuch Prodigious Follies; But that we know the Effects of *Heat* will be ſuch, as will ſcarce fall vnder the Conceit of Man; If the force of it bee altogether kept in.

Experiment Solitary, touching the *Impoſſibility of Annihilation.*

100

THere is nothing more Certaine in Nature, than that it is impoſſible for any *Body*, to be vtterly *Annihilated*; But that, as it was the worke of the Omnipotency of God, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well ſaid, by an Obſcure Writer of the *Sect* of the *Chymiſts*; That there is no ſuch way to effect the Strange *Tranſmutations* of *Bodies*, as to endeuour and vrge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained alſo a great Secret of Preſeruation of Bodies from Change; For if you can prohibite, that they neither turne into *Aire*, becauſe no *Aire* commeth to them; Nor goe into the *Bodies Adiacent*, becauſe they are vtterly Heterogeneall; Nor make a *Round* and *Circulation* within themſelues; they will neuer Change, though they bee in their Nature neuer ſo Periſhable, or Mutable. Wee ſee, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceiue the like will be of *Bodies* put into *Quick-ſilver*. But then they muſt be but thin; As a leafe, or a Peece of Paper, or Parchment; For if they haue a greater Craſſitude, they will alter in their owne Body, though they ſpend not. But of this we ſhall ſpeake more, when we handle the *Title* of *Conſeruation* of *Bodies*.

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NATVRALL HISTORIE.

II. Century.

MVsick in the *Practice*, hath beene well purſued; And in good Variety; But in the *Theory*, and eſpecially in the *Yeelding* of the *Cauſes* of the *Practique*, very weakly; Being reduced into certaine Myſticall Subtilties, of no vſe, and not much Truth. Wee ſhall therefore after our manner, ioyne the *Contemplatiue* and *Actiue Part* together.

Experiments in *Conſort* touching *Muſicks*.

101 All *Sounds*, are either *Muſicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are euer *Equall*; As *Singing*, the *Sounds of Stringed, and Wind-Inſtruments*, the *Ringing of Bels*, &c. Or *Immuſicall Sounds*; which are euer *Vnequall*; Such as are the *Voice in Speaking*, all *whiſperings*, all *Voices of Beaſts and Birds*, (except they bee *Singing Birds*;) all *Percuſſions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drums*;) and infinite others.

102 The *Sounds* that produce *Tones*, are euer from ſuch *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themſelues are *Equall*; And ſuch as are the *Percuſſions* of *Mettall*, as in *Bels*; Of *Glaſſe*, as in the Fillipping of a *Drinking Glaſſe*; Of *Aire*, as in *Mens voices whileſt they Sing*, in *Pipes*, *Whiſtles*, *Organs*, *Stringed inſtruments*, &c. And of *Water*: as in the *Nightingale-pipes* of *Regalls*, or *Organs*, and other *Hydraulickes*;

which the *Ancients* had, and *Nero* did ſo much eſteeme, but are now loſt. And if any Man thinke, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an errour. For the *Sound* is not created betweene the *Bow* or *Plectrum*, and the *String*; but betweene the *String* and the *Aire*; No more than it is betweene the *Finger* or *Quill*, and the *String*, in other *Inſtruments*. So there are (in effect) but three *Percuſſions* that create *Tones*; *Percuſſions* of *Metalls* (comprehending *Glaſſe*, and the like;) *Percuſſions* of *Aire*; and *Percuſſions* of *Water*.

103 The *Diapaſon* or *Eight* in *Muſicke* is the ſweeteſt *Concord*; Inſomuch, as it is in effect an *Vniſon*; As wee ſee in *Lutes*, that are ſtrung in the Baſe *Strings* with two ſtrings, one an *Eight* aboue another; Which make but as one *Sound*. And euery *Eighth Note* in Aſcent (as from *Eight* to *Fifteene*, from *Fifteene* to *twenty two*, and ſo *in infinitum*,) are but *Scales of Diapaſon*. The *Cauſe* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It ſeemeth that Aire, (which is the Subiect of *Sounds*) in *Sounds* that are not *Tones* (which are all *vnequall*, as hath beene ſaid) admitteth much Variety; As wee ſee in the *Voices* of *Liuing Creatures*; And likewiſe in the *Voices* of ſeuerall *Men*; (for we are capable to diſcerne ſeuerall *Men* by their *Voices*;) and in the *Coniugation of Letters*; whence *Articulate Sounds* proceed; Which of all others are moſt various. But in the Sounds which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to caſt it ſelfe into any ſuch variety; But is forced to recurre into one and the ſame Poſture or Figure, onely differing in Greatneſſe and Smalneſſe. So we ſee *Figures* may be made of lines, Crooked and Streight in infinite Variety, where there is Inequality; But *Circles*, or *Squares*, or *Triangles Equilaterall* (which are all *Figures*, of equall lines) can differ but in Greater, or Leſſer.

104 It is to bee noted (the rather leſt any Man ſhould thinke, that there is any thing in this number of *Eight*, to create the *Diapaſon*) that this Computation of *Eight*, is a thing rather receiued, than any true Computation. For a true Computation ought euer to bee, by Diſtribution into equall Portions. Now there bee interuenient in the *Riſe of Eight* (in *Tones*) two *Beemolls*, or *Halfe notes*; So as if you diuide the *Tones* equally, the *Eight* is but ſeuen whole and equall *Notes*; And if you ſubdiuide that into *Halfe Notes* (as it is in the Stops of a *Lute*) it maketh the *Number* of *Thirteene*.

105 Yet this is true; That in the ordinary Riſes and Falls of the *Voice* of *Man* (not meaſuring the *Tone* by whole Notes, and halfe Notes, which is the Equall Meaſure;) there fall out to bee two Beemols (as hath beene ſaid) betweene the *Vniſon* and the *Diapaſon*: And this Varying is naturall. For if a Man would endeuour to raiſe or fall his *Voice*, ſtill by *Halfe-notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfes*; as farre as an *Eight*; he will not be able to frame his *Voice* vnto it. Which ſheweth that after euery three whole *Notes* Nature requireth, for all Harmonicall vſe, one *Halfe-Note* to be interpoſed.

106 It is to bee conſidered, that whatſoeuer Vertue is in *Numbers*, for

Conducing

Conducing to Conſent of *Notes*, is rather to bee aſcribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelue*; So that the *Seuenth*, or the *Thirteenth*, is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seuenth* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

107 The *Concords* in *Muſicke* which are *Perfect*, or *Semiperfect*, betweene the *Vniſon*, and the *Diapaſon*, are the *Fifth*, which is the moſt *Perfect*; the *Third* next; and the *Sixth* which is more harſh: And as the Ancients eſteemed, and ſo doe my ſelfe and ſome Other yet, the *Fourth* which they call *Diateſſaron*. As for the the *Tenth*, *Twelfth*, *Thirteenth*, and ſo *in infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*, being an *Eight* reſpectiuely from them.

108 For *Diſcords*, the *Second*, and the *Seuenth*, are of all others the moſt odious, in *Harmony*, to the *Senſe*; whereof the One is next aboue the *Vniſon*, the Other next vnder the *Diapaſon*: which may ſhew, that *Harmony* requireth a competent diſtance of *Notes*.

109 In *Harmony*, if there bee not a *Diſcord* to the *Baſe*, it doth not diſturbe the *Harmony*, though there bee a *Diſcord* to the *Higher Parts*; So the *Diſcord* bee not of the Two that are Odious; And therefore the ordinary *Conſent* of *Foure Parts* conſiſteth of an *Eight*, a *Fifth*, and a *Third* to the *Baſe*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cauſe* is, for that the *Baſe* ſtriking more Aire, doth ouercome and drowne the *Treble*, (vnleſſe the *Diſcord* bee very Odious;) And ſo hideth a ſmall Imperfection. For we ſee, that in one of the *Lower ſtrings* of a *Lute*, there ſoundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Baſe*.

110 Wee haue no *Muſicke* of *Quarter-Notes*; And it may bee, they are not capable of *Harmony*; For wee ſee the *Halfe-Notes* themſelues doe but interpoſe ſometimes. Neuertheleſſe we haue ſome *Slides*, or *Reliſhes*, of the Voice, or Strings, as it were continued without *Notes*, from one *Tone* to another, riſing or falling, which are delightfull.

111 The Cauſes of that which is *Pleaſing*, or *Ingrate* to the *Hearing*, may receiue light by that, which is *Pleaſing* or *Ingrate* to the *Sight*. There bee two Things Pleaſing to the Sight, (leauing *Pictures*, and *Shapes* aſide, which are but Secondary Obiects; And pleaſe or diſpleaſe but in Memory;) theſe two are, *Colours*, and *Order*. The Pleaſing of *Colour* ſymbolizeth with the *Pleaſing* of any *Single Tone* to the *Eare*; But the Pleaſing of *Order* doth ſymbolize with *Harmony*. And therefore wee ſee in *Garden-knots*, and the *Frets of Houſes*, and all equall and well anſwering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they pleaſe; whereas *vnequall Figures* are but Deformities. And both theſe *Pleaſures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*: *Good Proportion*, or *Correſpondence*: So that (out of *Queſtion*,) *Equality*, and *Correſpondence*, are the *Cauſes* of *Harmony*. But to finde the *Proportion* of that *Correſpondence*, is more abſtruſe; whereof notwithſtanding wee ſhall ſpeake ſomewhat, (when we handle *Tones*,) in the generall Enquiry of *Sounds*.

Tones

112 *Tones* are not ſo apt altogether to procure *Sleepe*, as ſome other *Sounds*; As the *Winde*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cauſe* whereof is, for that *Tones*, becauſe they are Equall, and ſlide not, doe more ſtrike and erect the Senſe, than the other. And Ouer-much Attention hindereth *Sleepe*.

113 There bee in *Muſicke* certaine *Figures*, or *Tropes*; almoſt agreeing with the *Figures* of *Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senſes*. Firſt, the *Diuiſion* and *Quauering*, which pleaſe ſo much in *Muſicke*, haue an Agreement with the *Glittering* of *Light*; As the *Moone-Beames* playing vpon a Waue. Againe, the *Falling* from a *Diſcord* to a *Concord*, which maketh great Sweetneſſe in *Muſicke*, hath an Agreement with *Affections*, which are reintigrated to the better, after ſome diſlikes: It agreeth alſo with the *Taſte*, which is ſoone glutted with that which is ſweet alone. The *Sliding from the Cloſe or Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Preter Expectatum*; For there is a Pleaſure euen in *Being deceiued*. The *Reports* and *Fuges*, haue an Agreement with the *Figures* in *Rhetoricke*, of *Repetition*, atd *Traduction*. The *Tripla's*, and *Changing of Times*, haue an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Meaſure Time*, are in the *Medley*, of one *Dance*.

114 It hath beene anciently held, and obſerued, that the *Senſe of Hearing*, and the *Kindes of Muſicke*, haue moſt Operation vpon *Manners*; As to Incourage Men, and make them Warlike; To make them Soft and Effeminate; To make them Graue; To make them Light; To make them Gentle and inclined to Pity, &c. The *Cauſe* is, for that the *Senſe of Hearing* ſtriketh the *Spirits* more immediately, than the other *Senſes*; And more incorporeally than the *Smelling*: For the *Sight*, *Taſte*, and *Feeling*, haue their Organs, not of ſo preſent and immediate Acceſſe to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh alſo immediatly vpon the *Spirits*, and is forcible while the Obiect remaineth,) it is with a Communication of the Breath, or Vapour of the *Obiect Odorate*: But *Harmony* entring eaſily, and Mingling not at all, and Comming with a Manifeſt Motion; doth by Cuſtome of often Affecting the *Spirits*, and Putting them into one kinde of Poſture, alter not a little the Nature of the *Spirits*, euen when the Obiect is remoued. And therefore wee ſee, that *Tunes* and *Aires*, euen in their owne Nature, haue in themſelues ſome Affinity with the *Affections*; As there bee *Merry Tunes*, *Doleſull Tunes*, *Solemne Tunes*; *Tunes inclining Mens Mindes to Pity*; *Warlike Tunes*; &c. So as it is no Maruell, if they alter the *Spirits*; Conſidering that *Tunes* haue a Prediſpoſition to the *Motion* of the *Spirits* in themſelues. But yet it hath beene noted, that though this variety of *Tunes*, doth diſpoſe the *Spirits* to variety of Paſſions, conforme vnto them; yet generally, *Muſicke* feedeth that diſpoſition of the *Spirits* which it findeth. Wee ſee alſo that ſeuerall *Aires*, and *Tunes*, doe pleaſe ſeuerall *Nations*, and *Perſons*, according to the Sympathy they haue with their *Spirits*.

Experiments in Conſort, touching *Sounds*; and firſt touching the *Nullity and Entity of Sounds.*

Perſpective hath beene with ſome diligence inquired; And ſo hath the *Nature* of *Sounds*, in ſome ſort, as farre as concerneth *Muſicke*. But the *Nature of Sounds* in generall, hath beene ſuperficially obſerued. It is one of the ſubtilleſt Peeces of Nature. And beſides, I practiſe, as I doe aduiſe; which is, after long Inquiry of Things, Immerſe in Matter, to interpoſe ſome Subiect, which is Immateriate, or leſſe Materiate; Such as this of *Sounds*: To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is firſt to bee conſidered, what *Great Motions* there are in Nature, which paſſe without *Sound*, or *Noiſe*. The *Heauens* turne about, in a moſt rapide Motion, without *Noiſe* to vs perceiued; Though in ſome *Dreames* they haue beene ſaid to make an excellent *Muſicke*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stellæ Cadentes*, &c.) yeeld no *Noiſe*. And if it bee thought, that it is the Greatneſſe of diſtance from vs, whereby the *Sound* cannot bee heard; Wee ſee that *Lightnings*, and *Coruſcations*, which are neere at hand, yeeld no *Sound* neither. And yet in all theſe, there is a Percuſſion and Diuiſion of the *Aire*. The *Winds* in the *Vpper Region* (which moue the *Clouds* aboue (which wee call the *Racke*) and are not perceiued below) paſſe without *Noiſe*. The *Lower Winds* in a plaine, except they bee ſtrong, make no *Noiſe*; But amongſt Trees, the *Noiſe* of ſuch *Winds* will bee perceiued. And the *Winds* (generally) when they make a *Noiſe*, doe euer make it vnequally, Riſing and Falling, and ſometimes (when they are vehement) Trembling at the Height of their Blaſt. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noiſe*, in paſſing thorow the *Aire*, till it fall vpon the Ground, Water, Houſes, or the like. *Water* in a *Riuer* (though a ſwift Streame) is not heard in the Channell, but runneth in Silence, if it bee of any depth; But the very *Streame* vpon *Shallowes*, of Grauell, or Pebble, will bee heard. And *Waters*, when they beat vpon the Shore, or are ſtraitned, (as in the falls of Bridges;) Or are daſhed againſt themſelues by *Winds*, giue a Roaring *Noiſe*. Any *peece of Timber*, or *Hard Bodie*, being thruſt forwards by another Body Contiguous, without knocking, giueth no *Noiſe*. And ſo *Bodies* in weighing, one vpon another, though the *vpper Body* preſſe the *Lower Body* downe, make no *Noiſe*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cauſe of *Violent Motion*, though vnobſerued;) paſſeth without *Sound*; For that *Sound*, that is heard ſometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulſion of the Parts. So it is manifeſt; That where the Anteriour Body giueth way, as faſt as the Poſteriour commeth on, it maketh no *Noiſe*; be the *Motion* neuer ſo great or ſwift. 115

Aire open, and at *Large*, maketh no *Noiſe*, except it bee ſharply percuſſed; As in the *Sound* of a String, where *Aire* is percuſſed by a hard, 116

and

and ſtiffe Body; And with a ſharpe looſe; For if the String bee not ſtrained, it maketh no *Noiſe*. But where the *Aire is pent*, and ſtraitned, there Breath or other Blowing, (which carry but a gentle Percuſſion) ſuffice to create *Sound*; As in *Pipes*, and *Wind-Inſtruments*. But then you muſt note, that in *Recorders*, which goe with a gentle Breath, the *Concaue* of the *Pipe*, were it not for the *Fipple*, that ſtraitneth the Aire (much more than the *Simple Concaue*;) would yeeld no *Sound*. For as for other *Wind-Inſtruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters Hornes*, *&c.* Which appeareth by the blowne cheekes of him that windeth them. *Organs* alſo are blowne with a ſtrong winde, by the Bellowes. And note againe, that ſome kinde of *Wind-Inſtruments*, are blowne at a ſmall Hole in the ſide, which ſtraitneth the Breath at the firſt Entrance; The rather in reſpect of their *Trauerſe*, and *Stop* aboue the Hole, which performeth the *Fipples* Part; As it is ſeene in *Flutes*, and *Fifes*, which will not giue *Sound*, by a Blaſt at the end, as *Recorders*, &c. doe. Likewiſe in all *whiſtling*, you contract the Mouth; And to make it more ſharpe, Men ſometimes vſe their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they giue no Sound: No more doe *Bullets*, except they happen to bee a little hollowed in the Caſting; Which Hollowneſſe penneth the *Aire*: Not yet *Arrowes*, except they be ruffled in their Feathers, which likewiſe penneth the *Aire*. As for *Small whiſtles*, or *Shepherds Oaten Pipes*; they giue a *Sound*, becauſe of their extreme Slenderneſſe, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voices* of *Men*, and Liuing Creatures, paſſe thorow the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a ſharpe Percuſſion; And beſides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be *very ſoftly percuſſed*, giue no *Sound*; As when a man treadeth very ſoftly vpon *Boards*. So *Cheſts* or *Doores* in faire weather, when they open eaſily, giue no *Sound*. And *Cart-wheeles* ſqueake not when they are liquored.

118 The *Flame of Tapers*, or *Candles*, though it be a ſwift Motion, and breaketh the *Aire*, yet paſſeth without *Sound*. *Aire in Ouens*, though (no doubt) it doth (as it were) boyle, and dilate it ſelfe, and is repercuſſed; yet it is without *Noiſe*.

119 *Flame percuſſed by Aire*, giueth a *Noiſe*; As in Blowing of the Fire by Bellowes; Greater, than if the Bellowes ſhould blow vpon the *Aire* it ſelfe. And ſo likewiſe *Flame percuſſing the Aire ſtrongly*, (as when Flame ſuddenly taketh, and openeth,) giueth a *Noiſe*; So, Great *Flames*, whiles the one impelleth the other, giue a bellowing *Sound*.

120 There is a Conceit runneth abroad, that there ſhould bee a *white Powder*, which will diſcharge a Peece without *Noiſe*; which is a dangerous Experiment, if it ſhould bee true: For it may cauſe ſecret Murthers. But it ſeemeth to mee vnpoſſible; For, if the *Aire pent*, bee driuen forth and ſtrike the *Aire open*, it will certainely make a *Noiſe*. As for the *White Powder* (if any ſuch thing bee, that may extinguiſh, or dead the *Noiſe*,)

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it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any man thinke, that the *Sound* may bee extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more diuided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a Peece, it may be, it would giue seuerall Sounds, both at the Nose, and at the sides. But I conceiue, that if it were possible, to bring to passe, that there should bee no *Aire* pent at the Mouth of the Peece, the Bullet might flye with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* vpon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire* that striketh vpon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Concaue* of *Metall*, no more than you meane to fill with powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to haue killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning glasse*, when she walked in *Saint Iames* Parke, from the Leads of the House. But thus much (no doubt) is true; That if *Burning-Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Nauy*.) the *Percussion* of the *Aire* alone, by such a *Burning glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings*, without *Thunders*. 121

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conueighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore as the Bullet *moueth* so *swift*, that it is *Inuisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For wee see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*. 122

All *Eruptions of Aire*, though small and slight; giue an *Entity of Sound*; which wee call *Crackling*, *puffing*, *Spitting*, &c. As in *Bay-sale*, and *Bay-leaues*, cast into the Fire; So in *Chesnuts*, when they leape forth of the Ashes; So in *Greene wood*, laid vpon the Fire, especially *Roots*, So in *Candles* that spit Flame, if they bee wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose Leafe* gathered together into the fashion of a Purse, and broken vpon the Fore-head, or Backe of the Hand, as Children vse. 123.

THE *Cause* giuen of *Sound*, that it should be an *Elision* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting*, or *Dividing* or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance; And the Motion is but a Catch of the Wit vpon a few Instances; As the Manner is in the *Philosophy* Receiued. And it is common with Men, that if they haue

Experiments in Consort touching *Production*, *Conseruation*, and *Delation of Sounds*; And the *Office*.

of the Aire therein.

124

haue gotten a Pretty *Expression*, by a *Word* of *Art*, that *Expression* goeth current; though it bee empty of *Matter*. This Conceit of *Elision*, appeareth most manifestly to bee false, in that the *Sound* of a *Bell*, *string*, or the like, continueth melting, some time, after the *Percussion*; But ceaseth streight-waves, if the *Bell*, or *String*, be touched and stayed; whereas, if it were the *Elision* of the *Aire*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, should extinguish so suddenly that Motion, caused by the *Elision* of the *Aire*. This appeareth yet more manifestly, by *Chiming* with a Hammer, vpon the Out-side of a *Bell*; For the *Sound* will be according to the inward Concaue of the *Bell*; whereas the *Elision*, or *Attenuation* of the *Aire*, cannot bee but onely betweene the *Hammer*, and the Out-side of the *Bell*. So againe, if it were an *Elision*, a broad *Hammer*, and a *Bodkin*, stricke vpon Metall, would giue a diuers *Tone*; As well as a diuers *Loudnesse*: But they doe not so; For though the *Sound* of the one bee *Louder*, and of the other *Softer*, yet the *Tone* is the same. Besides, in *Eccho's*, (whereof some are as loud as the *Originall Voice*,) there is no new *Elision*; but a *Repercussion* onely. But that which conuinceth it most of all, is, that *Sounds* are generated, where there is no *Aire* at all. But these and the like Conceits, when Men haue cleared their vnderstanding, by the light of Experience, will scatter, and breake vp like a Mist.

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It is certaine, that *Sound* is not produced at the first, but with some *Locall Motion* of the *Aire*, or *Flame*, or some other *Medium*. Nor yet without some *Resistance*, either in the *Aire*, or the *Body Percussed*. For if there bee a meere Yeelding, or Cession, it produceth no *Sound*; As hath beene said. And therein *Sounds* differ from *Light*, and Colours; which passe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the first, or after. But you must attentiuely distinguish, betweene the *Locall Motion* of the *Aire*, (which is but *Vehiculum Causæ*, *A Carrier of the Sounds*,) and the *Sounds* themselues, Conueighed in the *Aire*. For as to the former, wee see manifestly, that no *Sound* is produced (no not by *Aire* it selfe against other *Aire*, as in *Organs*, &c.) but with a perceptible *Blast* of the *Aire*; And with some *Resistance* of the *Aire* stricken. For euen all *Speech*, (which is one of the gentlest *Motions* of *Aire*,) is with expulsion of a little *Breath*. And all *Pipes* haue a Blast, as well as a *Sound*. Wee see also manifestly, that *Sounds* are carried with *Winde*: And therefore *Sounds* will bee heard further with the *Winde*, than against the *Winde*; And likewise doe rise and fall with the Intension or Remission of the *Winde*. But for the *Impression* of the *Sound*, it is quite another Thing; And is vtterly without any *Locall Motion* of the *Aire*, Perceptible; And in that resembleth the *Species visible*: For after a *Man* hath lured, or a *Bell* is rung, wee cannot discerne any *Perceptible Motion* (at all) in the *Aire*, as long as the *Sound* goeth; but onely at the first. Neither doth the *Wind* (as farre as it carrieth a *Voice*,) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Variety of Words. And if a *Man* speake a good loudnesse, against

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the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*; will moue the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation of things visible*; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

126 Neuertheless it is true, that vpon the *Noise* of *Thunder*, and great *Ordnance*; Glasse windowes will shake; and Fishes are thought to bee fraied with the Motion, caused by *Noise* vpon the Water. But these Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound* (as hath beene said;) and not from the *Sound*.

127 It hath beene anciently reported, and is still receiued, that *Extreme Applauses*, and *Shouting of People* assembled in great Multitudes, haue so rarified, and broken the Aire, that *Birds* flying ouer, haue falne downe, the Aire being not able to support them. And it is beleeued by some, that *Great Ringing of Bels* in populous Cities, hath chased away *Thunder*: and also dissipated Pestilent Aire: All which may be also from the Concussion of the Aire, and not from the *Sound*.

128 A very great *Sound*, neere hand, hath stricken many *Deafe*; And at the Instant they haue found, as it were, the breaking of a Skin or Parchment in their Eare: And my selfe standing neere on that *Lured* loud, and shrill, had suddenly an Offence, as it somewhat had broken, or beene dislocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary Singing, or Hissing, but farre louder, and differing;) so as I feared some *Deafenesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred vnto the *Sound*: For (as is commonly receiued) an *ouer-potent Obiect* doth destroy the *Sense*; And *spirituall Species*, (both *Visible* and *Audible*) will worke vpon the Sensories, though they moue not any other *Body*.

129 In *Delation of Sounds*, the *Enclosure* of them preserueth them, and causeth them to bee heard further. And wee finde in Roules of Parchment, or Trunkes, the Mouth being laid to the one end of the Roule of Parchment, or Trunke, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such Concaues it is conserued, and contracted. So also in a Peece of Ordnance, if you speake in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

130 It is further to bee considered, how it proueth, and worketh, when the *Sound* is not enclosed all the Length of his Way, but passeth partly through open Aire; As where you *speake* some distance from a *Trunke*; or where the *Eare* is some distance from the *Trunke*, at the other End; Or where both *Mouth* and *Eare* are distant from the *Trunke*. And

it is tried, that in a long *Trunke*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* bee a handfull, or more, from the Ends of the *Trunke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neere, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131 As the *Encloſure*, that is *Round about and Entire*, preſenteth the *Sound*; So doth a *Semi-Concaue*, though in a leſſe degree. And therefore, if you diuice a *Trunke* or a *Cane* into two, and one ſpeake at the one end, and you lay your Eare at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concaue*; but if you doe the like vpon the *Maſt* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one ſpeake vpon the Surface of the *Ordnance*, and not at any of the Bores,) the *Voice* will be heard further, than in the Aire at large.

132 It would bee tried, how, and with what proportion of diſaduantage, the *Voice* will bee carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a Line Retorted; Or in ſome *Pipe* that were Sinuous.

133 It is certaine, (howſoeuer it croſſe the Receiued Opinion) that *Sounds* may be created without *Aire*, though *Aire* bee the moſt fauourable *Deferent* of *Sounds*. Take a *Veſſell* of *Water*, and knap a paire of Tongs ſome depth within the Water, and you ſhall heare the *Sound* of the Tongs well, and not much diminiſhed; And yet there is no *Aire* at all preſent.

134 Take one *Veſſell of Silver*, and another of *Wood*, and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome, and you ſhall finde the *Sound* much more Reſounding from the *Veſſell* of *Silver*, than from that of *Wood*: And yet if there bee no Water in the *Veſſell*, ſo that you knap the Tongs in the *Aire*, you ſhall finde no difference, betweene the *Silver* and *Woodden Veſſell*. Whereby, beſide the maine point of creating *Sound* without *Aire*, you may collect two things: The one, that the *Sound* communicateth with the Bottome of the *Veſſell*: The other, that ſuch a Communication paſſeth farre better, thorow *Water*, than *Aire*.

135 Strike any *Hard Bodies* together, in the Middeſt of a *Flame*, and you ſhall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

136 The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath ſome Affinity with the *Aire*, performeth, in ſome degree, the Parts of the *Aire*; As when you knocke vpon an *Empty Barrell*, the *Sound* is (in part) created by the Aire on the Out-ſide; And (in part) by the *Aire* in the Inſide; For the *Sound* will bee greater or leſſer, as the Barrell is more Empty, or more full; But yet the *Sound* participateth alſo with the *Spirit* in the *Wood*, thorow which it paſſeth, from the Out-ſide to the Inſide: And ſo it commeth to paſſe, in the *Chiming* of *Bels*, on the Out-ſide; where alſo the *Sound* paſſeth to the Inſide: And a number of o-

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ther like Instances, whereof we shall speake more, when wee handle the *Communication* of *Sounds*.

It were extreme Grosseneſſe to thinke (as wee haue partly touched before) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire*, from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the Touch, to his former Place: which *Motion* of *Result* is quicke and sharpe; Whereas the first Motion, is soft and dull. So the *Bow* torttureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*. 137

TAke a *Trunke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is; for that *Sound* diffuseth it selfe in round; And so spendeth it selfe; But if the *Sound*, which would scatter in *Open Aire*, bee made to goe all into a Canale; It must needs giue greater force to the *Sound*. And so you may note, that *Enclosures* doe not only preserue *Sound*, but also Encrease and Sharpen it. Experiments in Consort touching the *Magnitude*, and *Exility*, and *Damps* of *Sounds*. 138

A *Hunters Horne*, being greater at one end, than at the other, doth increase the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser end, and afterwards hauing more Roome to spread at the greater end; doe dilate themselues; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And euen *Hunters Hornes*, which are sometimes made streight, and not Oblique, are euer greater at the lower end. 139

It would be tried also in *Pipes*, being made *far larger* at the lower end: Or being made with a *Belly* towards the lower End; And then issuing into a streight Concaue againe.

There is in *Saint Iames fields*, a *Conduit* of *Bricke*, vnto which ioyneth a *low Vault*; And at the End of that, a *Round House* of Stone: And in the *Bricke Conduit* there is a Window; And in the *Round House* a Slit or Rift of some little breadth: If you cry out in the Rift, it will make a fearfull Roaring at the Window. The *Cause* is the same with the former; For that all *Contaues*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out; 140

Hawkes Bells, that haue Holes in the Sides, giue a greater Ring, than if the Pellet did strike vpon Brasse, in the *Open Aire*. The Cause is the same with the first *Instance* of the *Trunke*, Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* vnspent, and more strong. 141

In *Drummes*, the Closeneſſe round about; that preserueth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum Hole*, *farre* more loud, and strong, than if you should strike vpon the like *Skin*, extended 142

lended in the Open Aire. The *Cause* is the same with the two precedent.

143 *Sounds* are better heard, and further off, in an *Euening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cause* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thicke (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse: And so it is a Degree of *Enclosure*. As for the *Night*, it is true also, that the Generall Silence helpeth.

144 There bee two Kinds of *Reflexions* of *Sounds*; The one at *Distance*, which is the *Eccho*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which wee shall speake hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neere at hand) returneth immediately vpon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musicke* vpon the water soundeth more; And so likewise *Musicke* is better in Chambers Wainscotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginalls, doe giue a farre greater *Sound*, by reason of the *Knot*, and *Board*, and *Concaue* vnderneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Vpper Aire into the Lower. The *Cause* is, the Communication of the Vpper Aire with the Lower; And penning of both from Expence, or dispersing.

146 An *Irish Harpe* hath Open Aire on both sides of the *Strings*. And it hath the *Concaue* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more Resounding *Sound*, than a *Bandora*, *Orpharion*, or *Cittern*, which haue likewise *Wire-strings*. I judge the *Cause* to bee, for that Open Aire on both Sides helpeth, so that there be a *Concaue*; Which is therefore best placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cause* is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*. Which maintaineth likewise the former *Instance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* somewhat.

148 There is a *Church* at *Glocester* (and as I haue heard, the like is in some other places:) where if you speake against a Wall, softly, another shall heare your *Voice* better a good Way off, than neere hand. Enquire more particularly of the Frame of that place. I suppose there is some Vault, or Hollow, or Isle, behind the Wall, and some Passage to it towards the further end of that Wall, against which you speake; So as the *Voice* of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; for it is preserued somewhat by the plaine Wall; but that is too weake to giue a *Sound* Audible, till it hath communicated with the backe *Aire*.

149 Strike vpon a *Bow-string*, and lay the *Horne* of the *Bow* neere your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed,

cuſſed, before the Aire diſperſeth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*, from the Teeth, to the Inſtrument of Hearing; For there is a great Entercourſe betweene thoſe two Parts; As appeareth by this, That a Harſh *Grating Tune* ſetteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put vpon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Braſſe*, and hold the one end to your Eare, and ſtrike vpon the other, it maketh a far greater *Sound*, than the like Stroke vpon the *Rod*, not ſo made Contiguous to the Eare. By which, and by ſome other *Inſtances*, that haue beene partly touched, it ſhould appeare; That *Sounds* doe not onely ſlide vpon the Surface of a Smooth Body, but doe alſo communicate with the Spirits, that are in the Pores of the Body. 150

I remember in *Trinity College* in *Cambridge*, there was an *Vpper Chamber*, which being thought weake in the Roofe of it, was ſupported by a Pillar of Iron, of the bigneſſe of ones Arme, in the middeſt of the *Chamber*; Which if you had ſtrucke, it would make a little flat Noiſe in the *Roome* where it was ſtrucke; But it would make a great Bombe in the *Chamber* beneath. 151

The *Sound* which is made by *Buckets* in a *well*, when they touch vpon the *water*; Or when they ſtrike vpon the ſide of the *well*; Or when two Buckets daſh the one againſt the other; Theſe *Sounds* are deeper and fuller, than if the like Percuſſion were made in the *Open Aire*. The *Cauſe* is, the Penning and Encloſure of the Aire, in the Concaue of the *well*. 152

Barrels placed in a Roome vnder the Floare of a *Chamber*, make all *Noiſes* in the ſame Chamber, more Full and Reſounding. 153

So that there be fiue wayes (in generall) of Maioration of Sounds: Encloſure Simple; Encloſure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Senſory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth paſſe thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *water*, which is likewiſe a very Cloſe Body, and ſuch an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by ſuch paſſage, to a great *weakneſſe*, or *Exilitie*. If therefore you ſtop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noiſe, or Rattle. And ſo doth the *Aëtites*, or *Eagles* Stone, which hath a little Stone within it. 154

And as for *water*, it is a certaine Triall: Let a Man goe into a *Bath*, and take a *Paile*, and turne the Bottome vpward, and carry the Mouth of it, (Euen,) downe to the Leuell of the *water*; and ſo preſſe it downe vnder the *water*, ſome handful and an halfe, ſtill keeping it euen, that it may not tilt on either ſide, & ſo the Aire get out: then let him that is in the *Bath*, diue with his Head ſo far vnder *Water*, as he may put his head into the *Paile*; & there wil come as much *Aire* bubling forth, as wil make 155

Roome for his Head. Then let him ſpeak; & any that ſhall ſtand without, ſhall heare his *Voice* plainly; but yet made extreme ſharp and exile, like the *Voice* of *Puppets*: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handſomly done, if the *Paile* be put ouer the Mans head aboue water, and then he cowre downe, and the *Paile* be preſſed downe with him. Note that a man muſt kneele or ſit, that he may be lower than the *Water*. A man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he ſaith; That *Hercules Page Hylas* went with a Waterpot, to fill it at a pleaſant *Fountaine*, that was neere the Shore, and that the *Nymphs* of the *Fountaine* fell in loue with the Boy, & pulled him vnder *water*, keeping him aliue; And that *Hercules* miſſing his *Page*, called him by his Name, aloud, that all the ſhore rang of it, and that *Hylas* from within the Water, anſwered his Maſter; But (that which is to the preſent purpoſe) with ſo ſmall and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was faſt by.

156 In *Lutes* and *Inſtruments* of *Strings*, if you ſtop a *String* high (whereby it hath leſſe ſcope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and ſtrike the edge of the one againſt the bottom of the other, within a *Paile* of *Water*; And you ſhall finde, that as you put the Sawcers lower and lower, the Sound groweth more flat; euen while Part of the *Sawcer* is aboue the Water; But that Flatneſſe of *Sound* is ioyned with a Harſhneſſe of *Sound*; which (no doubt) is cauſed by the inequality of the *Sound*, which commeth from the part of the *Sawcer* vnder the *Water*, and from the Part aboue. But when the *Sawcer* is wholly vnder the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*; As if a Bell hath Cloth, or Silk wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericals*, the Keyes are lined; And in Colleges they vſe to line the Tablemen.

159 Triall was made in a *Recorder*, after theſe ſeuerall manners. The Bottome of it was ſet againſt the Palme of the Hand; ſtopped with Wax round about; ſet againſt a Damaske Cuſhion; Thruſt into Sand; Into Aſhes; Into Water (halfe an inch vnder the Water;) Cloſe to the Bottome of a Siluer Baſin; And ſtill the *Tone* remained: but the Bottome of it was ſet againſt a Woollen Carpet; A Lining of Pluſh; A Lock of Wooll, (though looſely put in;) Againſt Snow; And the Sound of it was quite deaded, and but Breath.

160 *Iron* Hot, produceth not ſo full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more ſoft, and leſſe reſounding. So likewiſe *warme Water*, when it falleth, maketh not ſo full a *Sound*, as *Cold*: And I conceiue it is ſofter, and neerer the Nature of Oile; For it is more ſlippery; As may be perceiued, in that it ſcowreth better.

161 Let there be a *Recorder* made, with two *Fipples*, at each end one; The

Trunke

Trunke of it of the length of two *Recorders*, and the Holes answerable toward each end; And let two play the same lesson vpon it, at an Vnison: And let it be noted, whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* bee made, of two Trunckes (thorow-out) hollow; And let two speake, or sing, the one long-waies, the other trauerse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture* of *Sounds*; whereof we shall speake hereafter.

A *Bellowes* blowne in at the *Hole* of a *Drumme*, and the *Drum* then stucken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindereth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moueable. 162

THe *Loudnesse* and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly stucken, giueth the greater *Sound*; But a *Treble String*, if hard stucken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper percussion.

Experiments in Consort touching the *Loudnesse* or *Softnesse* of *Sounds*; and their *Carriage at longer or shorter Distance.*

It is therfore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; 163
Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *strength* of this *percussion* consisteth as much, or more, in the *Hardnesse* of the *Body percussed*, as in the *Force* of the *Body percussing*: For if you strike against a Cloth, it will giue a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant,) it giueth the flatter *Sound*; If against Siluer, or Brasse, the more Ringing *Sound*. 164
As for *Aire*, where it is strongly pent, it matcheth a *Hard Bodie*. And therfore we see in discharging of a *Peece*, what a great *Noise* it maketh. We see also, that the Charge with Bullet; Or with paper wet, and hard stopped; Or with powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report.

The *Sharpnesse* or *Quickenesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *strength*: As in a Whip, or Wand, if you strike the *Aire* with it; the sharper and quicker you strike it, the *louder Sound* it giueth. And in playing vpon the *Lute*, or *Virginals*, the quicke stroke or Touch, is a great life to the *Sound*. The *Cause* is; for that the Quicke Striking cutteth the *Aire* speedily; whereas the Soft Striking doth rather beat than cut. 165

Experiments in *Consort* touching the *Communication* of *Sounds*.

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Emptie Vessels, *&c.*) hath beene touched obiter, in the *Maioration* of *Sounds*: But it is fit also to make a *Title* of it apart.

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166 The *Experiment* for greateſt Demonſtration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; Where if you ſtrike with a Hammer vpon the Vpper Part, and then vpon the Midſt, and then vpon the Lower, you ſhall finde the *Sound* to bee more Treble, and more Baſe, according vnto the Concaue, on the Inſide; though the Percuſſion bee onely on the Out-ſide.

167 When the *Sound* is created betweene the *Plaſt* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neuertheleſſe ſome *Communication* with the Matter of the Sides of the *Pipe*, and the Spirits in them contained; for in a *Pipe* or *Trumpet*, of Wood, and Braſſe, the *Sound* will bee diuers; So if the *Pipe* be couered with *Cloth*, or *Silke*, it will giue a diuers *Sound*, from that it would doe of it ſelfe; So, if the *Pipe* bee a *little wet* on the Inſide, it will make a differing *Sound*, from the ſame *Pipe dry*.

168 That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*, it doth with *Aire*; *Vide Experimentum* 134.

Experiments in Conſort, touching *Equality*, and *Inequality* of *Sounds*.

Wee haue ſpoken before (in the *Inquiſition* touching *Muſicke*,) of *Muſicall Sounds*, whereunto there may be a Concord or Diſcord in two Parts; Which Sounds we call Tones: And likewiſe of *Immuſicall Sounds*; And haue giuen the *Cauſe*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*: And wee haue alſo expreſſed there, what are the *Equall Bodies* that giue *Tones*, and what are the *Vnequall* that giue none. But now wee ſhall ſpeake of ſuch *Inequality* of *Sounds*, as proceedeth, not from the Nature of the Bodies themſelues, but is Accidentall; Either from the *Roughneſſe*, or *Obliquitie* of the *Paſſage*; Or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it haue a *Riſt* in it, whereby the *Sound* hath not a cleare Paſſage, giueth a *Hoarſe* and *Iarring Sound*; So the *Voice* of *Man*, when by cold taken the Weſill groweth rugged, and (as we call it) furred, becommeth hoarſe. And in theſe two *Inſtances*, the *Sounds* are Ingrate; becauſe they are meerly vnequall: But, if they bee *Vnequall* in *Equality*, then the *Sound* is Gratefull, but Purling.

170 All *Inſtruments*, that haue either *Returnes*, as Trumpets; Or *Flexions*, as Cornets; Or are *Drawne vp*, and *put from*, as Sackbuts; haue a *Purling Sound*: But the *Recorder* or *Flute*, that haue none of theſe *Inequalities*, giue a cleare *Sound*. Neuertheleſſe, the *Recorder* it ſelfe, or *Pipe* moiſtened a little in the Inſide, ſoundeth more ſolemnly, and with a little Purling, or Hiſſing. Againe, a *Wreathed String*, ſuch as are in the Baſe Strings of *Baudoues*, giueth alſo a *Purling Sound*.

171 But a *Lute-ſtring*, if it be meerely *Vnequall* in his Parts, giueth a Harſh and

and vntuneable *Sound*; which *Strings* wee call *False*; being bigger in one Place than in another; And therefore *wire-strings* are neuer *False*. We see also, that when wee try a *False Lute-string*, wee vse to extend it hard betweene the fingers, and to fillip it; And if it giueth a double *Species*, it is *True*; But if it giueth a Treble, or more, it is *False*.

172 *Waters*, in the *Noise* they make as they run, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they haue a *Pipe*, they call the *Nightingale-Pipe*, which containeth *water*) the *Sound* hath a continuall Trembling: And Children haue also little Things they call *Cocks*, which haue *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinity with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

173 All *Base Notes*, or very *Treble Notes*, giue an Asper *Sound*; For that the *Base* striketh more *Aire*, than it can well strike equally: And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane* or *Tenor*, is the sweetest Part.

174 We know nothing, that can at pleasure make a *Musicall* or *Immusicall Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The *Cause* is (no doubt) in the Weasill or Wind-pipe, (which we call *Aspera Arteria*,) which being well extended, gathereth *Equality*; As a Bladder that is wrinckled; if it bee extended, becommeth smooth. The Extension is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can neuer giue a *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the Throat, than in *Speaking*; As appeareth in the Thrusting out, or Drawing in of the Chin, when we sing.

175 The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceiued, by some of the Ancients, not to come forth at their Mouth, but to bee an *Inward Sound*; But (it may bee) it is neither; But from the motion of their Wings; For it is not heard but when they stirre.

176 All *Metalls quenched* in *water*, giue a Sibilation or Hissing Sound; (which hath an Affinity with the letter *Z*.) notwithstanding the *Sound* be created betweene the *water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small store of *water* in a Vessell, giueth a Hissing *Sound*; But *Boyling* in a full Vessell, giueth a Bubling *Sound*, drawing somewhat neere to the *Cackes* vsed by Children.

177 Triall would be made, whether the *Inequality*, or Interchange of the *Medium*, will not produce an *Inequality* of *Sound*; As if three *Bells* were made one within another, and *Aire* betwixt Each; and then the outermost *Bell* were Chimed with a Hammer, how the *Sound* would differ from a Simple *Bell*. So likewise take a *Plate* of *Brasse*, and a planke of *wood*, and ioyne them close together, and knocke vpon one of them, and see if they doe not giue an *Vnequall Sound*. So make two or three *Partitions* of *wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*.

Experiments in Consort, touching the more Treble, and the more Base Tones, or Musicall Sounds.

178 IT is euident, that the *Percussion* of the *Greater quantity of Aire*, causeth the *Baser Sound*; And the lesse *Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude* of the *Concaue*, by which the *Sound* passeth; and by the *Longitude* of the same *Concaue*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; And the neerer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baser*.

179 It is also euident, that the *Sharper* or *Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower* or *Heauier*, the more *Base Sound*. So we see in *Strings*; the more they are wound vp, and strained; (And thereby giue a more quicke start backe;) the more *Treble* is the *Sound*; And the slacker they are, or lesse wound vp, the *Baser* is the *Sound*. And therefore a Bigger *String* more strained, and a lesser *String*, lesse strained, may fall into the same *Tone*.

180 *Children*, *Women*, *Eunuchs* haue more small and shrill *Voices* than *Men*. The Reason is, not for that *Men* haue greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voice*, at the yeares of Puberty, is more obscure. It seemeth to be, for that when much of the Moisture of the Body which did before irrigate the Parts, is drawne downe to the Spermaticall vessels; it leaueth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilosity, more Roughnesse of the Skin, Hardnesse of the Flesh, &c.

181 The Industry of the *Musitian*, hath produced two other Meanes of *Straining*, or *Intension* of *Strings*, besides their *winding vp*. The one is the *Stopping* of the *String* with the *Finger*; As in the Neckes of Lutes, Viols, &c. The other is the *Shortnesse* of the *String*; As in Harps, Virginalls, &c. Both these haue one, and the same reason; for they cause the *String* to giue a quicker start.

182 In the *straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good Winding of a String, before it will make any Note at all: And in the Stops of Lutes, &c. the higher they goe, the lesse Distance is betweene the Frets.

183 If you fill a *Drinking Glasse* with *water*, (especially one sharpe below, and Wide aboue,) and fillip vpon the Brim, or Out-side; And after empty Part of the *Water*, and so more and more, and still try the *Tone* by Fillipping; you shall find the *Tone* fall, and bee more *Base*, as the *Glasse* is more Empty.

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Experiments in Conſort, touching the *Proportion* of *Treble* and *Baſe Tones*.

The Iuſt and Meaſured *Proportion* of the *Aire Percuſſed*, towards the *Baſeneſſe* or *Trebleneſſe* of *Tones*, is one of the greateſt Secrets in the Contemplation of *Sounds*. For it diſcouereth the true *Coincidence* of *Tones* into *Diapaſons*; Which is the Returne of the ſame *Sound*. And ſo of the *Concords* and *Diſcords*, betweene the *Vniſon*, and *Diapaſon*; Which we haue touched before, in the *Experiments* of *Muſicke*; but thinke fit to reſume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*: In the *Proportion* of the *Diſtance* of *Frets*; And in the *Proportion* of the *Concaue* of *Pipes*, &c. But moſt commodiouſly in the laſt of theſe.

184 Try therefore the *Winding* of a *String* once about, aſſoone as it is brought to that Extenſion, as will giue a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Riſe of the *Tone*: Whereby you ſhall diſcouer, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimenſion* of the *Winding*; And the *Proportion* likewiſe of the *Sound* towards the *String*, as it is more or leſſe ſtrained. But note that to meaſure this, the way will bee, to take the Length in a right Line of the *String*, vpon any Winding about of the Peg.

185 As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the firſt Stop of the *String*, vnto ſuch a Stop as ſhall produce a *Diapaſon* to the former Stop, vpon the ſame *String*.

186 But it will beſt (as it is ſaid) appeare, in the *Bores* of *Wind-Inſtruments*: And therefore cauſe ſome halfe dozen *Pipes*, to be made, in length, and all things elſe, alike, with a ſingle, double, and ſo on to a ſextuple *Bore*, And ſo marke what Fall of *Tone* euery one giueth. But ſtill in theſe three laſt *Inſtances*, you muſt diligently obſerue, what *Length of String*, or *Diſtance* of *Stop*, or *Concaue* of *Aire*, maketh what *Riſe* of *Sound*. As in the laſt of theſe (which (as wee ſaid) is that, which giueth the apteſt demonſtration,) you muſt ſet downe what Encreaſe of *Concaue* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And ſo vp to the *Diapaſon*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not vnlike, that thoſe that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewiſe *Bell-Founders* in fitting the Tune of their *Bels*. So that Enquiry may ſaue Triall. Surely, it hath beene obſerued by one of the *Ancients*, that an *Empty Barrell* knocked vpon with the finger, giueth a *Diapaſon* to the *Sound* of the like *Barrell full*: But how that ſhould bee, I doe not well vnderſtand; For that the knocking of a *Barrell full*, or *Empty*, doth ſcarce giue any *Tone*.

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187 There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the Passiue: And that it bee not too neare, but at a distance. For in a *Recorder*, the three vppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the Winding or Stopping of *Strings*.

Experiments in Consort touching *Exteriour*, and *Interiour Sounds*.

There is another Difference of *Sounds*, which wee will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musicall*, nor *Immusicall*: Though it bee true, that there can bee no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may bee both *Musicall* and *Immusicall*. Wee shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that wee meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

188 In *Speech* of *Man*, the *whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can neuer make a *Tone*, nor sing in *whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Conchue*, (though soft) is an *Exteriour*. So likewise, the greatest *Windes*, if they haue no Coarctation, or blow not hollow, giue an *Interiour Sound*; The Whistling or hollow *Winde* yeeldeth a Singing, or *Exteriour Sound*; The former being pent by some other Body; The latter being pent in by his owne Density: And therefore wee see, that when the *Winde* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moueth within it selfe, or is blowne by a *Bellowes*, giueth a Murmur or *Interiour Sound*.

189 There is no *Hard Body*, but strucke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: Insomuch as if the Percussion bee ouer-soft, it may induce a Nullity of *Sound*; But neuer an *Interiour Sound*; As when one treadeth so softly, that he is not heard.

190 Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it neuer giueth an *Exteriour Sound*; As if you blow strongly with a Bellowes against a Wall.

191 *Sounds* (both *Exteriour* and *Interiour*,) may bee made as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

Experiments in *Consort* touching *Articulation of Sounds*.

192 IT is euident, and it is one of the strangest Secrets in *Sounds*, that the *whole Sound* is not in the whole *Aire* onely; But the *whole Sound* is also in euery small *Part* of the *Aire*. So that all the curious Diuersity of *Articulate*

culate Sounds, of the Voice of Man, or Birds, will enter at a ſmall Cranny, Inconfuſed.

193 The *Vnequall Agitation* of the *Winds*, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or leſſe way; yet they doe not confound the *Articulation* of them at all, within that diſtance that they can be heard; Though it may be, they make them to be heard leſſe Way, than in a Still, as hath beene partly touched.

194 Ouer-great Diſtance confoundeth the *Articulation* of *Sounds*; As we ſee, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot diſtinguiſh what he ſaith. And one *Articulate Sound*, will confound another; As when many ſpeake at once.

195 In the *Experiment* of *Speaking under Water*, when the Voice is reduced to ſuch an Extreme Exility, yet the *Articulate Sounds*, (which are the *Words*,) are not confounded; as hath beene ſaid.

196 I conceiue, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Diſperſing*: And although (as was formerly ſaid) a *Sound Articulate*, already created, will be contracted into a ſmall Cranny; yet the firſt *Articulation* requireth more Dimenſion.

197 It hath beene obſerued, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewiſe in the Roofe, a Preacher cannot be heard ſo well, as in the like Places not ſo Vaulted. The Cauſe is, for that the *Subſequent Words* come on, before the *Precedent Words* vaniſh: And therefore the *Articulate Sounds* are more confuſed, though the Groſſe of the *Sound* be greater.

198 The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the ſeuerall *Alphabeticall Letters*, are worthy Enquiry, and pertinent to the preſent *Inquiſition* of *Sounds*: But becauſe they are ſubtill, and long to deſcribe, we will refer them ouer, and place them amongſt the *Experiments of Speech*. The *Hebrewes* haue beene diligent in it, and haue aſſigned, which *Letters* are *Labiall*, which *Dentall*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they haue diſtinguiſhed betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mutæ Tenues*, *Mediæ*, and *Aſpiratæ*; Not amiſſe; But yet not diligently enough. For the ſpeciall *Strokes*, and *Motions*, that create thoſe *Sounds*, they haue little enquired: As that the *Letters*, *B.P.F.M.* are not expreſſed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters N.* and *B.* cannot be pronounced, but that the *Letter N.* will turne into *M.* As *Hecatomba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced together, but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

199 The *Lungs* are the moſt Spongy Part of the Body; And therefore ableſt to contract, and dilate it ſelfe; And where it contracteth it ſelfe,

it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Pallat*, and the reſt of thoſe they call *Inſtruments* of *voice*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that haue no *Voice Articulate*; and diuers *Letters* of *Articulate Voices*: And commonly Men haue giuen ſuch Names to thoſe *Sounds*, as doe allude vnto the Articulate Letters. As *Trembling* of *Water* hath Reſemblance with the *Letter* L; *Quenching* of *Hot Metals*, with the *Letter* Z; *Snarling* of *Dogs*, with the *Letter* R; The *Noiſe of Scritchowles*, with the *Letter* Sh; *Voice* of *Cats*, with the *Dypthong* Eu; *Voice* of *Cuckoes*, with the *Dypthong* Ou; *Sounds*, of *Strings*, with the *Letter* Ng: So that if a Man, (for Curioſity, or Strangeneſſe ſake) would make a *Puppet*, or other Dead Body, to pronounce a *word*;

Let him conſider, on the one Part, the Motion of the *Inſtruments of Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; and what Conformity there is that cauſeth the Similitude of *Sounds*; And by that hee may miniſter light to that Effect.

(* * *)

NATV-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatsoeuer) moue Round; That is to say; On *all Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backewards*. This appeareth in all *Instances*.

201 Experiments in Consort touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Vpwards*, *downwards*; *Forwards*, *Backwards*.

Sounds doe not require to be conueyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may bee *Arched*; Though it be true, they moue strongest in a *Right line*, which neuertheless is not caused by the *Rightnesse* of the *Line*, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore wee see, if a *wall* bee betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* passeth thorow the *wall*; but *Archeth* ouer the *wall*.

202

If the *Sound* bee *Stopped* and *Repercussed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one Side of the Boot be downe, and the other vp; And a Beggar beg on the Close Side; you would thinke that he were on the Open Side. So likewise, if a or *Bell Clocke*, be (for Example) on the North-side of a Chamber; And the Window of that Chamber be vpon the South; Hee that is in the Chamber will thinke the *Sound* came from the South.

203

Sounds though they *spread round*, (so that there is an *Orbe* or *Spheric all Area* of the *Sound*,) yet they moue strongest, and goe furthest in the *Fore-lines*, from the first Locall Impulsion of the Aire. And therefore in *Preaching*, you shall heare the *Preachers* Voice, better before the Pulpit than behinde it, or on the Sides, though it stand open. So a *Harquebuz*, or *Ordnance*, will be further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides.

204

It may bee doubted, that *Sounds* doe moue better Downwards

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than Vpwards. *Pulpits* are placed high aboue the People. And when the Ancient *Generalls* ſpake to their Armies, they had euer a Mount of Turfe caſt vp, whereupon they ſtood: But this may bee imputed to the Stops and Obſtacles, which the voice meeteth with, when one ſpeaketh vpon the leuell. But there ſeemeth to bee more in it: For it may bee, that *Spirituall Species*, both of *Things Viſible* and *Sounds*, doe moue better *Downewards* than *Vpwards*. It is a ſtrange Thing, that to Men ſtanding below on the Ground, thoſe that bee on the Top of Pauls, ſeeme much leſſe than they are, and cannot bee knowne; But to Men aboue, thoſe below ſeeme nothing ſo much leſſened, and may be knowne, yet it is true, that all things to them aboue, ſeeme alſo ſomewhat contracted, and Better collected into Figure: As *Knots* in *Gardens* ſhew beſt from an Vpper-window, or Tarras.

206 But to make an exact Triall of it, let a Man ſtand in a *Chamber*, not much aboue the Ground, and ſpeake out at the window, thorow a *Trunke*, to one ſtanding on the ground, as ſoftly as hee can, the other laying his Eare cloſe to the *Trunke*: Then *viâ verſa*, let the other ſpeake *below* keeping the ſame Proportion of Softneſſe; And let him in the *Chamber* lay his Eare to the *Trunke*: And this may bee the apteſt Meanes, to make a Iudgement, whether *Sounds* deſcend, or aſcend, better.

Experiments in Conſort, touching the *Laſting & Periſhing of Sounds*; And touching the *Time* they require to their *Generation*, or *Delation*.

207 After that *Sound* is created (which is in a moment) wee finde it continueth ſome ſmall time, melting by little and little. In this there is a wonderfull Errour amongſt Men, who take this to bee a *Continuance* of the Firſt *Sound*: whereas (in truth) it is a *Renouation*, and not a *Continuance*: For the *Body percuſſed*, hath by reaſon of the *Percuſſion*, a *Trepidation* wrought in the *Minute Parts*; and ſo reneweth the *Percuſſion* of the *Aire*. This appeareth manifeſtly, becauſe that the Melting *Sound* of a Bell, or of a String ſtrucken, which is thought to be a *Continuance*, ceaſeth as ſoon as the Bell or String are touched. As in a Virginall, as ſoone as euer the Iacke falleth; and toucheth the String, the Sound ceaſeth; And in a Bell after you haue chimed vpon it, if you touch the Bell, the *Sound* ceaſeth. And in this you muſt diſtinguiſh, that there are two *Trepidations*: The one Manifeſt and Locall; As of the Bell, when it is penſile: The other Secret, of the Minute Parts; ſuch as is deſcribed in the ninth Inſtance. But it is true, that the *Locall* helpeth the *Secret* greatly. Wee ſee likewiſe that in Pipes, and other wind-Inſtruments, the *Sound* laſteth no longer, than the breath bloweth. It is true, that in Organs, there is a confuſed Murmur for a while, after you haue plaied; But that is but while the Bellowes are in Falling.

208 It is certaine, that in the *Noiſe* of great *Ordnance*, where many are ſhot off together, the *Sound* will bee carried, (at the leaſt) twenty Miles vpon the Land; and much further vpon the Water. But then it will come to the Eare; Not in the Inſtant of the Shooting off, but it will come an Houre, or more later. This muſt needs bee a *Continuance* of the *Firſt Sound*; For there is no *Trepidation* which ſhould renew it. And

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the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more than Momentany.

209 To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and haue with him a Taper; And let some Vaile bee put before the Taper; And let another man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same Instant with-draw the Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light seene*, and the *Sound Heard*: For it is certaine that the *Delation* of Light is in an Instant. This may bee tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

210 It is generally knowne and obserued, that *Light* and the *Obiect* of *Sight*, moue swifter than *Sound*; For wee see the *Flash* of a Peece is seene sooner than the *Noise* is heard. And in hewing wood, if one be some distance off, he shall see the Arme lifted vp for a second Stroke, before hee heare the Noise of the first. And the greater the Distance, the greater is the Preuention: As wee see in Thunder which is farre off; where the Lightning Precedeth the Cracke a good space.

211 *Colours*, when they represent themselues to the Eye, fade not, nor melt not by Degrees, but appeare still in the same strength: But *Sounds* melt, and vanish, by little and little. The cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire* (as a Cause *Sinè quâ non*,) in that, it perisheth so suddenly; For in euery Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe; which the *Water* also doth, but nothing so swiftly.

Experiments in Consort touching the *Passage*, and *Interceptions of Sounds*.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing by the Sides* of a Body, for the *Passing thorow* a Body: And therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chincke.

212 Where Sound passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bells stopped, &c.) the *Hard*, or *Close Body*, must bee but thin and small; For else it deadeth and extinguisheth the *Sound* vtterly. And therefore in the *Experiment* of *Speaking in Aire vnder Water*, the Voice must not be very deepe within the *Water*: For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard: And if there were an Hogshead empty, whereof the Sides were some two Foot thicke, and the bunghole stopped; I conceiue the Resounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none; But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full.

213 It is certaine, that in the *Passage* of *Sounds*, thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard Body it selfe, doth cooperate; But much better, when the sides of that *Hard Body* are strucke, than when the Percussion is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped vp, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell giue any *Sound* at all, or how weake? But note, that you must in stead of the Threed take a Wire; Or else let the Glasse haue a great Belly; lest when you shake the Bell, it dash vpon the Sides of the Glasse.

214 It is plaine, that a very *Long*, and *Down-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard ouer a Wall, will not be heard ouer a Church; Nor that *Sound*, which will bee heard, if you stand some distance from the Wall, will bee heard if you stand close vnder the Wall.

215 *Soft* and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As wee see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they bee very Close, will checke a *Sound* more, than the like Thicknesse of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

216 It is worthy the Enquiry, whether *Great Sounds* (As of Ordnance, or Bells) become not more *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds* (it may be) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps) not so well.

Experiments in Consort, touching the *Medium* of *Sounds*.

THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *water*. And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and vnapt *Deferents*, except the *Aire*.

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Euening Sounds*;

218 And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the *Title* of *Maioration* of *Sounds*; Being for that *Thin Aire* is better pierced; but *Thicke Aire* preserueth the *Sound* better from Wast; Let further Triall bee made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

219 How farre forth *Flame* may bee a *Medium* of *Sounds* (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

220 Whether any other *Liquors*, being made *Mediums*, cause a Diuersity of *Sound* from *water*, it may bee tried: As by the Knapping of the Tongs; Or Striking of the Bottome of a Vessell, filled either with Milke,

or with Oyle, which though they be more light, yet are they more vnequall Bodies than Aire.

Of the Natures *of the* Mediums, *we haue now ſpoken; As for the* Diſpoſition *of the ſaid* Mediums, *it doth conſiſt in the Penning, or not Penning of the* Aire; *Of which wee haue ſpoken before, in the* Title *of* Delaiion *of* Sounds: *It conſiſteth alſo in the* Figure *of the* Concaue, *thorow which it paſſeth; Of which wee will ſpeake next.*

How the *Figures* of *Pipes*, or *Concaues*, thorow which *Sounds* paſſe; Or of other *Bodies different*; conduce to the Variety and Alteration of the *Sounds*; Either in reſpect of the *Greater Quantity*, or *leſſe Quantity* of *Aire*, which the *Concaues* receiue; Or in reſpect of the *Carrying* of *Sounds* longer or ſhorter way; Or in reſpect of many other *Circumſtances*; they haue beene touched, as falling into other *Titles*. But thoſe *Figures*, which we now are to ſpeake of, we intend to be, as they concerne the *Lines* thorow which *Sound* paſſeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c. Experiments in Conſort, what the *Figures* of the *Pipe*, or *Concaues*, or the *Bodies Diferent* conduce to the *Sounds*.

The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet comming off, and dilating more ſuddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they haue likewiſe *Straight Hornes*; which if they be of the ſame Bore with the *Oblique*, differ little in *Sound*; Saue that the Straight require ſomewhat a ſtronger Blaſt. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are ſtraight; But the *Recorder* hath a leſſe Bore, and a greater; Aboue, and below. The *Trumpet* hath the *Figure* of the *Letter* S: which maketh that Purling *Sound*, &c. Generally, the *Straight Line* hath the cleaneſt and roundeſt *Sound*, and the *Crooked* the more Hoarſe, and Iarring. 221

Of a *Sinuous Pipe*, that may haue ſome foure Flexions, Triall would be made. Likewiſe of a *Pipe*, made like a *Croſſe*, open in the middeſt. And ſo likewiſe of an *Angular Pipe*: And ſee what will be the Effects of theſe ſeuerall *Sounds*. And ſo againe of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you ſhall blow; And another Hole not farre from that; But with a Trauerſe or Stop between them; So that your breath may goe the Round of the *Circle*, and come forth at the ſecond Hole. You may trie likewiſe *Percuſſions* of *Solide Bodies* of ſeuerall *Figures*; As *Globes*, *Flats*, *Cubes*, *Croſſes*, *Triangles*, &c. And their *Combinations*; As *Flat* againſt *Flat*; And *Conuex* againſt *Conuex*; And *Conuex* againſt *Flat*, &c. And marke well the diuerſities of the *Sounds*. Trie alſo the difference in *Sound* of ſeuerall *Craſſitudes* of *Hard Bodies* percuſſed; And take knowledge of the diuerſities of the *Sounds*. I my ſelfe haue tryed, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Siluer*, or *Braſſe*, but rather better: yet we ſee that a peece 222

peece of Money of *Gold* ſoundeth farre more flat than a peece of Money of *Siluer*.

223 The *Harpe* hath the *Concaue*, not along the *Strings*, but acroſſe the *Strings*; And no *Inſtrument* hath the *Sound* ſo Melting, and Prolonged, as the *Iriſh Harpe*. So as I ſuppoſe, that if a *Virginall* were made with a double *Concaue*, the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harpe* hath; It muſt needs make the *Sound* perfecter, and not ſo Shallow, and Iarring. You may trie it, without any Sound-Board along, but only Harpe-wiſe, at one end of the *Strings*: Or laſtly with a double *Concaue*, at Each end of the *Strings* one.

Experiments in Conſort, touching the *Mixture* of *Sound*.

224 THere is an apparent Diuerſity between the *Species Viſible*, and *Audible*, in this; That the *Viſible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if we looke abroad, we ſee Heauen, a number of Starres, Trees, Hills, Men, Beaſts, at once. And the *Species* of the one doth not confound the other. But if ſo many ſounds came from ſeuerall Parts, one of them would vtterly confound the other. So wee ſee, that *Voices*, or *Conſorts* of *Muſicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true neuertheleſſe, that a great *Light* drowneth a ſmaller, that it cannot be ſeene; As the *Sunne* that of a *Gloworme*, as well as a Great *Sound* drowneth a leſſer. And I ſuppoſe likewiſe that if there were two Lanthornes of Glaſſe, the one a Crimſin, and the other an Azure, and a Candle within either of them, thoſe Coloured Lights would mingle, and caſt vpon a White Paper a Purple Colour. And euen in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make Roomes more lightſome than blacke, &c. But the Cauſe of the *Confuſion* in *Sounds*, and the *Inconfuſion* in *Species Viſible*, is, For that the *Sight* worketh in Right Lines, and maketh ſeuerall *Cones*; And ſo there can be no Coincidence in the Eye, or Viſuall Point: But *Sounds*, that moue in Oblique and Arcuate Lines, muſt needs encounter, and diſturbe the one the other.

225 The ſweeteſt and beſt *Harmony* is, when euery *Part*, or *Inſtrument*, is not heard by it ſelfe, but a Conflation of them all; Which requireth to ſtand ſome diſtance off. Euen as it is in the *Mixture* of Perfumes; Or the Taking of the Smells of ſeuerall *Flowers* in the *Aire*.

226 The *Diſpoſition* of the *Aire*, in other *Qualities*, except it be ioyned with *Sound*, hath no great Operation vpon *Sounds*: For whether the *Aire* be lightſome or darke, hot or cold, quiet or ſtirring, (except it be with *Noiſe*) ſweet-ſmelling, or ſtinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227 But *Sounds* doe diſturbe and alter the one the other: Sometimes the one drowning the other; and making it not heard; Sometimes the one Iarring and diſcording with the other, and making a Confuſion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228 Two *Voices* of like *loudnes*, will not be heard, twice as far, as one

of

of them alone; And two *Candles* of like light, will not make Things ſeene twice as farre off, as one. The Cauſe is profound; But it ſeemeth that the *Impreſſions*, from the *Obiects* of the *Senſes*, do *mingle* reſpectiuely; euery one with his kinde; But not in proportion, as is before demonſtrated: And the reaſon may be, becauſe the firſt *Impreſſion*, which is from *Priuatiue* to *Actiue*, (As from *Silence* to *Noiſe*, or from *Darkneſſe* to *Light*,) is a greater Degree, than from *Leſſe Noiſe*, to *More Noiſe*, or from *Leſſe light*, to *More light*. And the Reaſon of that againe may be; For that the *Aire*, after it hath receiued a Charge, doth not receiue a Surcharge, or greater Charge, with like Apperite, as it doth the firſt Charge. As for the Encreaſe of Vertue, generally, what Proportion it beareth to the Encreaſe of the Matter, it is a large field, and to be handled by it ſelfe.

ALL *Reflections Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflection*, be cleane and ſmooth, it maketh them Sweeter. Tryall may be made of a *Lute* or *Violl*, with the Belly of poliſhed Braſſe, in ſtead of Wood. We ſee that euen in the open Aire, the *Wire String* is ſweeter, than the *String* of *Guts*. And we ſee that for *Reflexion*, *Water* excelleth; As in *Muſicke* neare the *Water*; Or in *Eccho's*. Experiments in Conſort, touching *Meliboration* of *Sounds*. 229

It hath been tryed, that a *Pipe* a little moiſtned on the inſide, but yet ſo as there be no Drops left, maketh a more ſolemne *Sound*, than if the *Pipe* were drie: But yet with a ſweet degree of *Sibillation* or *Purling*; As we touched it before in the title of *Equality*. The Cauſe is, for that all Things Porous, being ſuperficially wet, and (as it were) betweene drie and wet, become a little more Euen and Smooth; But the Purling, (which muſt needs proceed of Inequality,) I take to be bred betweene the Smoothneſſe of the inward Surface of the *Pipe*, which is wet, And the Reſt of the Wood of the *Pipe*, vnto which the Wet commeth not, but it remaineth drie. 230

In *Froſtie weather*, *Muſicke* within doores ſoundeth better. Which may be, by reaſon, not of the Diſpoſition of the *Aire*, but of the *wood* or *String* of the *Inſtrument*, which is made more Criſpe, and ſo more porous and hollow: And wee ſee that *Old Lutes* ſound better than *New*, for the ſame reaſon. And ſo doe *Lute-ſtrings* that haue beene kept long. 231

Sound is likewiſe *Meliorated* by the *Mingling* of *open Aire* with *Pent Aire*; Therefore Tryall may be made of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot ouer the Strings; yet ſo, as there be Roome enough for the Strings, and Roome enough to play below that Belly. Triall may be made alſo of an *Iriſh Harpe*, with a Concaue on both Sides; Whereas it vſeth to haue it but on one Side. The doubt may be, leſt it ſhould make too much Reſounding; whereby one Note would ouertake another. 232

If you ſing into the Hole of a *Drumme*, it maketh the *Singing* more ſweet. 233

ſweet. And ſo I conceiue it would, if it were a *Song* in Parts, ſung into ſeuerall *Drums*; And for handſomneſſe and ſtrangeneſſe ſake, it would not be amiſſe to haue a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

234 When a *Sound* is created in a *Wind-Inſtrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Bodie of the *Pipe*, it *melioarateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a Trumpet, or *Pipe* of *Wood*; And againe in a *Trumpet* or *Pipe* of *Braſſe*. It were good to trie *Recorders* and *Hunters Hornes* of *Braſſe*, what the *Sound* would be.

235 *Sounds* are *meliorated* by the *Intenſion*, of the *Senſe*; where the *Common Senſe* is collected moſt, to the *Particular Senſe* of *Hearing*, and the *Sight* ſuſpended: And therefore, *Sounds* are ſweeter, (as well as greater,) in the *Night*, than in the *Day*; And I ſuppoſe, they are ſweeter to blinde Men, than to Others: And it is manifeſt, that betweene *Sleeping* and *Waking*, (when all the *Senſes* are bound and ſuſpended) *Muſicke* is farre ſweeter, than when one is *fully waking*.

Experiments in Conſort touching the *Imitation* of *Sounds*.

236 IT is a Thing ſtrange in Nature, when it is attentiuely conſidered; How *Children* and ſome *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that ſpeaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquiſite: So one would thinke it were a Leſſon hard to learne. It is true, that it is done with time, and by little and little, and with many Eſſayes and Proffers: But all this diſchargeth not the Wonder. It would make a Man thinke (though this which we ſhall ſay may ſeeme exceeding ſtrange) that there is ſome *Tranſmiſſion* of Spirits; and that the *Spirits* of the *Teacher*, put in Motion, ſhould worke with the *Spirits* of the *Learner*, a Pre-diſpoſition to offer to *Imitate*; And ſo to perfect the *Imitation* by degrees. But touching *Operations* by *Tranſmiſſions* of *Spirits* (which is one of the higheſt Secrets in Nature,) we ſhall ſpeake in due place; Chiefly when wee come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a prediſpoſition to *Imitate*. Wee ſee how readie Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we ſee, how the Fooliſh Bird playeth the Ape in Geſtures: And no Man (in effect) doth accompany with others, but hee learneth, (ere he is aware,) ſome Geſture, or Voice, or Faſhion of the other.

237 In *Imitation* of *Sounds*, that *Man* ſhould be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like giuen them for the *Imitation*; And beſides, you ſhall haue Parrots, that will not only *imitate* Voyces, but Laughing, Knocking, Squeaking of a Doore vpon the Hinges, or of a Cart-wheele; And (in effect) any other *Noiſe* they heare.

238 No *Beaſt* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape

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it ſelfe, that is ſo ready to *imitate* otherwiſe, attaineth not any degree of *Imitation* of Speech. It is true, that I haue knowne a Dog, that if one howled in his Eare, he would fal a howling a great while: What ſhould be the Aptneſſe of *Birds*, in compariſon, of *Beaſts*, to *imitate* the *Speech* of *Man*, may be further enquired. We ſee that *Beaſts* haue thoſe Parts, which they count the *Inſtruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker vnto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* paſſeth; we ſee many *Beaſts* haue it, for the Length, as much as *Birds*. What better *Gorge*, or Attire, *Birds* haue, may be further enquired. The *Birds* that are knowne to be Speakers, are *Parrots*, *Pyes*, *Iayes*, *Dawes*, and *Rauens*. Of which *Parrots* haue an adunque Bill, but the reſt not.

But I conceiue, that the *Aptneſſe* of *Birds*, is not ſo much in the *Conformity* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* muſt come by *Hearing* and *Learning*; And *Birds* giue more heed, and marke *Sounds*, more than *Beaſts*; becauſe naturally they are more delighted with them, and practiſe them more; As appeareth in their *Singing*. We ſee alſo, that thoſe that teach *Birds* to ſing, doe keep them Waking, to increaſe their *Attention*. We ſee alſo that *Cocke-Birds* amongſt *Singing-Birds*, are euer the better *Singers*; which may be, becauſe they are more liuely, and liſten more, 239

Labour, and *Intention* to *imitate voices*, doth conduce much to *Imitation*: And therefore we ſee, that there be certaine *Pantomimi*, that will repreſent the voices of *Players* of *Enterludes*, ſo to life, as if you ſee them not, you would thinke they were thoſe *Players* themſelues; And ſo the *Voices* of other *Men* that they heare. 240

There haue beene ſome, that could counterfeit the *Diſtance* of *Voices* (which is a *Secondary Obiect* of *Hearing*) in ſuch ſort; As when they ſtand faſt by you, you would thinke the *Speech* came from afarre off, in a fearefull manner. How this is done, may be further enquired. But I ſee no great vſe of it, but for Impoſture, in counterfeiting Ghoſts or Spirits. 241

There be three Kinds of *Reflexions* of *Sounds*; A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflextion*, or an *Eccho* of an *Eccho*; whereof the firſt hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now ſpeake of. Experiments in Conſort touching the *Reflexion* of *Sounds*.

The *Reflexion* of *Species Viſible*, by *Mirrours*, you may command; Becauſe paſſing in Right Lines, they may be guided to any Point: But the *Reflexion* of *Sounds* is hard to maſter; Becauſe the *Sound* filling great Spaces in Arched Lines, cannot be ſo guided: And therefore we ſee there hath not beene practiſed, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome. 242

The *Naturall Eccho's* are made vpon *walls*, *Woods*, *Rockes*, *Hills*, and *Bankes*, As for *waters*, being neere, they make a *Concurrent Eccho*; But 243

being further off (as vpon a large *Riuer*) they make an *Iterant Eccho*: For there is no difference betweene the *Concurrent Eccho*, and the *Iterant*, but the Quickneſſe, or Slowneſſe of the Returne. But there is no doubt, but *Water* doth help the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine (as hath beene formerly touched, that if you ſpeake thorow a *Trunke*, ſtopped at the further end, you ſhall finde a Blaſt returne vpon your Mouth, but no *Sound* at all. The *Cauſe* is, for that the *Cloſeneſſe*, which preſerueth the *Originall*, is not able to preſerue the *Reflected Sound*: Beſides that *Eccho's* are ſeldome created but by loud *Sounds*. And therefore there is leſſe hope of *Artificiall Eccheos* in *Aire*, pent in a narrow Concaue. Neuertheleſſe it hath bin tried, that One leaning ouer a *well*, of 25. Fathome deep, and ſpeaking, though but ſoftly, (yet not ſo ſoft as a whiſper) the *Water* returned a good *Audible Eccho*. It would be tried whether Speaking in *Caues*, where there is no Iſſue, ſaue where you ſpeake, will not yeeld *Eccho's*, as *Wells* doe.

245 The *Eccho* commeth as the *Originall Sound* doth, in a Round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercuſſing maketh an Angle: As againſt the Returne of a Wall, &c. Alſo we ſee that in *Mirrours*, there is the like Angle of Incidence, from the Obiect to the Glaſſe, and from the Glaſſe to the Eye. And if you ſtrike a *Ball* ſide-long, not full vpon the Surface, the Rebound will be as much the contrary way; Whether there be any ſuch *Reſilience* in *Eccho's*, (that is, whether a Man ſhall heare better, if he ſtand aſide the Body Repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right Line betweene;) may be tried. Triall likewiſe would be made, by ſtanding neerer the Place of Repercuſſing, than hee that ſpeaketh; And againe by ſtanding further off, than he that ſpeaketh, And ſo Knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not ſtrongeſt neere hand.

246 There be many Places, where you ſhall heare a Number of *Eccho's* one after another: And it is when there is variety of *Hills* or *Woods*, ſome neerer, ſome further off: So that the Returne from the further, being laſt created, will be likewiſe laſt heard.

247 As the *Voice* goeth round, as well towards the Backe, as towards the Front of him that ſpeaketh; So likewiſe, doth the *Eccho*; For you haue many Back-*Eccho's*, to the Place where you ſtand.

248 To make an *Eccho*, that will report, three, or foure, or fiue Words, diſtinctly, it is requiſite, that the *Body Repercuſſing*, be a good diſtance off: For if it be neere, and yet not ſo neere, as to make a *Concurrent Eccho*, it choppeth with you vpon the ſudden. It is requiſite likewiſe, that the *Aire* be not much *pent*. For *Aire*, at a great diſtance, *pent*, worketh the ſame effect with *Aire*, at *large*, in a ſmall diſtance. And therefore in the *Triall* of *Speaking* in the *well*, *though* the *Well* was deepe, the *Voice* came backe, ſuddenly; And would beare the Report but of two Words.

For

For *Eccho's* vpon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Pont-charenton*; And some Bird-bolt shot, or more, from the Riuer of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Isles of *Churches*, also standing; The Roofe all open, not so much as any embowment neere any of the walls left. There was against euery Pillar, a Stacke of Billets, aboue a Mans Height; which the Watermen, that bring Wood downe the *Seane* in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene seuerall times; And I haue heard of others, that it would returne sixteene times: For I was there about three of the Clocke in the Afternoone: And it is best (as all other *Eccho's* are) in the Euening. It is manifest, that it is not *Eccho's* from seuerall places, but a *Tossing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-Glasses*; where if you place one *Glasse* before, and another behind, you shall see the *Glasse* behind with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and diuers such *Super-Reflexions*, till the *species speciei* at last die. For it is euery Returne weaker, and more shady. In like maner, the *Voice* in that *Cappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and euery *Reflexion* is weaker than the former: So that if you speake three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for sometimes; Still fading and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or fiue Words; In this *Eccho* of so many Returnes, vpon the matter, you heare aboue twenty Words for three. 249

The like *Eccho* vpon *Eccho*, but onely with two Reports, hath beene obserued to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will giue a *Back-Eccho*; One taking it from the other, and the latter the weaker. 250

There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S.* for one; Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to the Worke of Spirits. And of good Spirits. For (said he) call *Satan*, and the *Eccho*, will not deliuer backe the Deuils name; But will say, *Va' en*; Which is as much in *French*, as *Apage*, or *Auoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interiour Sound*. 251

Eccho's are some more sudden, and chop againe, as soone as the *Voice* is deliuered; As hath beene partly said: Others are more deliberate that is, giue more Space betweene the *Voice* and the *Eccho*, which is caused by the locall Neerenesse, or Distance; Some will report a longer Traine of Words; And some a shorter: Some more loud (full as loud as the *Originall*, 252

giuall, and sometimes more loud;) And some weaker and fainter.

253 Where *Eccho's* come from seuerall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and euen a *Continued Eccho*; which you shall finde in some *Hills*, that stand encompassed, Theater-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe therow diuers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliuer the *Sound* in a differing Place, from that vnto which it is deferred; which is the Proper Effect of *Refraction*. But *Maioration*, which is also the Worke of *Refraction*, appeareth plainly in *Sounds* (as hath beene handled at full;) But it is not by Diuersity of *Mediums*.

Experiments in Consort touching the *Consent* and *Dissent* between *Visibles* and *Audibles*.

We haue *obiter*, for Demonstrations sake, vsed in diuers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to prosecute that *Comparison* more fully.

CONSENT OF VISIBLES, and Audibles,

255 BOth of them *spread themselues in Round*, and fill a whole Floare or Orbe, vnto certaine Limits: and are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Obiects from the Sensories.

256 *Both* of them haue the whole *Species in euery small Portion of the Aire*, or *Medium*; So as the *Species* doe passe thorow small Crannies, without Confusion: As we see ordinarily in *Leuels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

257 *Both* of them are of a *sudden and easie Generation* and *Delation*; And likewise *perish swiftly*, and *suddenly*; As if you remoue the *Light*; Or touch the *Bodies* that giue the *Sound*.

258 *Both* of them doe *receiue* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quauerings, in *Audibles*.

259 *Both* of them in their Vertue and Working, doe not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stir any *euident locall Motion* in their *Mediums*, as they passe; but onely to carry certaine *Spirituall Species*; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

260 *Both* of them seeme not to *Generate* or *produce* any other *Effect in Nature*,

ture, but such as appertaineth to their proper Obiects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The first, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the Light of a Glow-worme; the Report of an Ordnance, the Voice: The Second, in that an *Obiect of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neere the Eare) the Hearing: The Third, in that *both of them will be reuerberate*; As in *Mirrours*; And in *Eccho's*. 261

Neither of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*; Nor *contra*. 262

Both of them *affect the Sense in Liuing Creatures*, and yeeld *Obiects of Pleasure and Dislike*: Yet neuerthelesse, the *Obiects* of them doe also (if it be well obserued) affect and worke vpon dead Things; Namely, such as haue some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke vpon a *Looking-Glasse*, which is like the Pupill of the Eye; And *Audibles* vpon the Places of *Eccho*, which resemble in some sort, the Caverne and Structure of the Eare. 263

Both of them doe *diuersly worke, as they haue their Medium diuersly disposed*. So a Troubling *Medium* (as Smoake) maketh the Obiect seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall. 264

To *Both*, the *Medium*, which is the most Propitious and Conducible, is *Aire*; For Glasse or Water, &c. are not comparable. 265

In *Both* of them, where the *Obiect is Fine and Accurate*, it conduceth much to haue the *Sense Intentiue, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentiuely; which in Beasts that haue Eares moueable, is most manifest. 266

The *Beames* of *Light*, when they are *multiplied* and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, haue fallen downe. 267

DISSENTS OF VISIBLES, and Audibles.

268 THE *Species* of *Visibles* seeme to bee *Emissions* of *Beames* from the *Object seene*; Almost like Odours; saue that they are more Incorporeall: But the *Species* of *Audibles* seeme to Participate more with *Local Motion*, like *Percussions* or *Impressions* made vpon the Aire. So that whereas all Bodies doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to be carried more manifestly thorow the Aire, than the *Species* of *Visibles*: For (I conceiue) that a contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, aboue all others, betweene *Visibles* and *Audibles*, that is the most remarkable; As that whereupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies bee cleare, and the Pores in a Right Line, as in Glasse, Crystall, Diamonds, Water, &c. But a thin Scarse, or Handkerchiefe, though they bee Bodies nothing so Solid, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but Solid Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice; but to the *Reuerberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are seene further off, than *Sounds* are heard; Allowing neuertheless the *Rate* of their *Bigneſſe*: For otherwise a *great Sound* will bee heard further off, than a *Small Body* seene.

272 *Visibles* require (generally) some *Distance* betweene the *Obiect*, and the *Eye*, to bee better seene; Whereas in *Audibles*, the neerer the Approach of the *Sound* is to the Sense, the better. But in this there may bee a double Errour. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all ouer) excludeth the *Light*. For I haue heard of a Person very credible (who himselfe was

cured

cured of a Cataract in one of his Eyes) that while the Siluer Needle did worke vpon the Sight of his Eye, to remoue the Filme of the Cataract, hee neuer ſaw any thing more cleare or perfect, than that white Needle: Which (no doubt) was, becauſe the Needle was leſſer than the *Pupill* of the *Eye*, and ſo tooke not the Light from it. The other Errour may be, for that the *Obiect* of *Sight* doth ſtrike vpon the *Pupill* of the *Eye*, directly without any interception; whereas the *Cane* of the *Eare* doth hold off the *Sound* a little from the Organ: And ſo neuertheleſſe there is ſome *Diſtance* required in both.

273 *Viſibles* are ſwiftlier carried to the *Senſe*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and the Report of a Peece; Motion of the Aire in Hewing of Wood. All which haue beene ſet downe heretofore, but are proper for this *Title*.

274 I conceiue alſo, that the *Species of Audibles* doe hang longer in the Aire, than thoſe of *Viſibles*: For although euen thoſe of *Viſibles*, doe hang ſome time, as we ſee in *Rings turned*, that ſhew like Spheres; In *Lute-ſtrings* fillipped; A *Fire-Brand* carried along, which leaueth a Traine of Light behind it; And in the *Twi-light*; And the like: Yet I conceiue that *Sounds* ſtay longer, becauſe they are carried vp and downe with the Wind: And becauſe of the Diſtance of the Time in *Ordnance diſcharged*, and *heard* 20. Miles off.

275 In *Viſibles*, there are not found Obiects ſo Odious and Ingrate to the *Senſe*, as in *Audibles*. For foule *Sights* doe rather diſpleaſe, in that they excite the Memory of foule Things, than in the immediate Obiects. And therefore in *Pictures*, thoſe foule Sights doe not much offend; But in *Audibles*, the Grating of a Saw, when it is ſharpned, doth offend ſo much, as it ſetteth the Teeth on Edge. And any of the *harſh Diſcords* in *Muſicke*, the Eare doth ſtraight-waies refuſe.

276 In *Viſibles*, after great Light, if you come ſuddenly into the *Darke*; Or contrariwiſe, out of the *Darke* into a *Glaring Light*, the Eye is dazled for a time, and the *Sight* confuſed; But whether any ſuch Effect be after great *Sounds*, or after *a deepe Silence*, may be better enquired. It is an old Tradition, that thoſe that dwell neere the *Cataracts* of *Nilus*, are ſtrucken deafe: But wee finde no ſuch Effect, in Cannoniers, nor Millers, nor thoſe that dwell vpon Bridges.

277 It ſeemeth that the *Impreſſion* of *Colour* is ſo weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Baſis is in the Obiect, and the Verticall Point in the Eye: So as there is a Corradiation and Coniunction of *Beames*; And thoſe *Beames* ſo ſent forth, yet are not of any force to beget the like borrowed or ſecond *Beames*, except it be by *Reflexion*, whereof we ſpeake not. For the *Beames* paſſe, and giue little Tincture to that Aire, which is Adiacent; which if they did, wee ſhould ſee *Colours* out of a Right line. But as this is in *Colours*, ſo otherwiſe it is in the *Body* of *Light*. For when there is a Skreene betweene the Candle and the Eye, yet the *Light* paſſeth to the Paper whereon One writeth; So that the *Light* is ſeene, where the Body of the *Flame* is not

ſcene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not bee ſeene. I iudge that *Sound* is of this Latter Nature: For when two are placed on both ſides of a Wall, and the Voice is heard, I iudge it is not onely the *Originall Sound*, which paſſeth in an *Arched Line*; But the *Sound*, which paſſeth aboue the Wall in a Right Line, begetteth the like Motion round about it, as the firſt did, though more weake.

Experimens in Conſort, touching the *Sympathy* or *Antipathy* of *Sounds*, one with another.

278 ALL *Concords* and *Diſcords* of *Muſicke*, are, (no doubt) *Sympathies*, and *Antipathies* of *Sounds*. And ſo (likewiſe) in that *Muſicke*, which wee call *Broken Muſicke*, or *Conſort Muſicke*; Some *Conſorts* of *Inſtruments* are ſweeter than others; (A Thing not ſufficiently yet obſerued:) As the *Iriſh Harpe*, and *Baſe Viall* agree well: The *Recorder* and *Stringed Muſicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welſh-Harpe*, and *Iriſh Harpe*; Or the *Voice* and *Pipes* alone, agree not ſo well; But for the *Melioration* of *Muſicke*, there is yet much left (in this Point of *Exquiſite Conſorts*) to try and enquire.

279 There is a Common Obſeruation, that if a *Lute*, or *Viall*, bee layed vpon the Backe, with a ſmall Straw vpon one of the *Strings*; And another *Lute* or *Viall* bee laid by it; And in the other *Lute* or *Viall*, the *Vniſon* to that *String* bee ſtrucken; it will make the *String* moue; Which will appeare both to the Eye, and by the *Strawes* falling off. The like will bee, if the *Diapaſon* or *Eight* to that *String* bee ſtrucken, either in the ſame *Lute* or *Viall*, or in others lying by; But in none of theſe there is any Report of *Sound*, that can bee diſcerned, but onely Motion.

280 It was deuiſed, that a *Viall* ſhould haue a Lay of Wire Strings below, as cloſe to the Belly, as a *Lute*; And then the *Strings* of Guts mounted vpon a Bridge, as in Ordinary *Vialls*; To the end, that by this meanes, the vpper *Strings* ſtrucken, ſhould make the lower reſound by *Sympathy*, and ſo make the *Muſicke* the better; Which, if it bee to purpoſe, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this deuice I conceiue to be of no vſe; becauſe the vpper *Strings*, which are ſtopped in great variety, cannot maintaine a *Diapaſon* or *Vniſon*, with the Lower, which are neuer ſtopped. But if it ſhould bee of vſe at all; it muſt be in *Inſtruments* which haue no Stops; as *Virginalls*, and *Harps*, wherein triall may bee made of two Rowes of Strings, diſtant the one from the other.

281 The *Experiment* of *Sympathy* may bee transferred (perhaps) from *Inſtruments* of *Strings*, to other *Inſtruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vniſon*, whether the ſtriking of the one would moue the other, more than if it were another Accord: And ſo in *Pipes* (if they bee of equall Bore, and *Sound*) whether a little Straw or Feather would moue in the one *Pipe*, when the other is blowne at an *Vniſon*.

It ſeemeth, both in *Eare*, and *Eye*, the *Inſtrument* of *Senſe* hath a *Sympathy* or Similitude with that which giueth the *Reflection*, (As hath beene touched before.) For as the *Sight* of the *Eye* is Like a Cryſtall, or Glaſſe, or Water; So is the *Eare* a ſinuous Caue, with a hard Bone, to ſtop and reuerberate the *Sound*: Which is like to the Places that report *Eccho's*. 282

WHen a Man *yawneth*, he cannot *Heare* ſo well. The *Cauſe* is, for that the *Membrane* of the *Eare* is extended; And ſo rather caſteth off the *Sound*, than draweth it to. Experiments in Conſort, touching the *Hindering* or *Helping* of the *Hearing*.

We *Heare* better when we *hold our Breath*, than contrary; In ſo much as in all Liſtening to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cauſe* is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driueth away the voice, than draweth it: And beſides wee ſee, that in all *Labour* to doe things with any ſtrength, we *hold the Breath*: And liſtening after any *Sound*, that is heard with difficulty, is a kinde of *Labour*. 283 284

Let it be tried, for the *Helpe* of the *Hearing*, (and I conceiue it likely to ſucceed,) to make an *Inſtrument* like a *Tunnell*; The narrow Part whereof may be of the Bigneſſe of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow end of it be ſet cloſe to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard diſtinctly, from further diſtance, than without that Inſtrument; being (as it were) an *Eare-Spectacle*. And I haue heard there is in *Spaine*, an *Inſtrument* in vſe to be ſet to the *Eare*, that *helpeth* ſomewhat thoſe that are Thicke of Hearing. 285

If the *Mouth* be ſhut cloſe, neuertheleſſe there is yeelded by the Roofe of the Mouth, a Murmur. Such as is vſed by dumbe Men: But if the *Noſtrils* be likewiſe ſtopped, no ſuch Murmure can be made; Except it be in the Bottome of the Pallate towards the Throat. Whereby it appeareth manifeſtly, that a *Sound* in the *Mouth*, except ſuch as afore ſaid, if the *Mouth* be ſtopped, paſſeth from the *Pallat*, thorow the *Noſtrils*.

THe *Repercuſſion* of *Sounds*, (which wee call *Eccho*,) is a great Argument of the *Spirituall Eſſence* of *Sounds*. For if it were *Corporeall*, the Repercuſſion ſhould be created in the ſame manner, and by like *Inſtruments*, with the *Originall Sound*: But we ſee what a Number of *Exquiſite Inſtruments* muſt concurre in Speaking of Words, whereof there is no ſuch Matter in the Returning of them; But only a plaine Stop, and *Repercuſsion*. Experiments in Conſort, touching the *Spirituall* and *Fine Nature* of *Sounds*. 287

The Exquiſite *Differences* of *Articulate Sounds*, carried along in the *Aire*, ſhew that they cannot be *Signatures* or *Impreſſions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent Impreſſions: And ſo it may bee thought of *Sounds* in their 288

their firſt Generation: But then the *Delation* and *Continuance* of them without any new Sealing, ſhew apparantly they cannot be Impreſſions.

289 All *Sounds* are ſuddenly made, and doe ſuddenly periſh; But neither that, nor the *Exquiſite Differences* of them, is Matter of ſo great Admiration: For the Quauerings, and Warblings in Lutes, and Pipes, are as ſwift; And the Tongue, (which is no very fine Inſtrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are vttered. But that *Sounds* ſhould not only be ſo ſpeedily generated, but carried ſo farre euery way, in ſuch a momentanie time, deſerueth more Admiration. As for Example; If a Man ſtand in the middle of a Field and ſpeake aloud, he ſhall be heard a Furlong in round; And that ſhall be in *Articulate Sounds*; And thoſe ſhall be Entire in euery little Portion of the Aire; And this ſhall be done in the Space of leſſe than a Minute.

290 The *Sudden Generation* and *Periſhing* of *Sounds*, muſt be one of theſe two Wayes. Either that the *Aire* ſuffereth ſome Force by *Sound*; and then reſtoreth it ſelfe; As Water doth; Which being diuided, maketh many Circles, till it reſtore it ſelfe to the naturall Conſiſtence: Or otherwiſe, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it ſhould ſeeme) a ſecret and hidden Appetite of Receiuing the *Sound* at the firſt; But then other Groſſe and more Materiate Qualities of the Aire ſtraightwayes ſuffocate it; Like vnto *Flame*, which is generated with Alacritie, but ſtraight quenched by the Enmitie of the *Aire*, or other Ambient Bodies.

There be theſe *Differences* (in generall) by which *Sounds* are diuided; 1. *Muſicall*, *Immuſicall*; 2. *Treble*, *Baſe*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harſh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We haue laboured (as may appeare,) in this *Inquiſition* of *Sounds*, diligently; Both becauſe *Sound* is one of the moſt Hidden Portions of *Nature*, (as we ſaid in the beginning:) And becauſe it is a *Vertue* which may be called *Incorporeall*, and *Immateriate*; whereof there be in *Nature* but few. Beſides, we were willing, (now in theſe our firſt *Centuries*,) to make a Patterne or Preſident of an *Exact Inquiſition*; And we ſhall doe the like hereafter in ſome other Subiects which require it. For wee deſire that Men ſhould learne and perceiue, how ſeuere a Thing the true *Inquiſition* of *Nature* is; And ſhould accuſtome

cuſtome themſelues, by the light of Particulars to enlarge their Mindes, to the Amplitude of the world; And not reduce the World to the Narrowneſſe of their Mindes.

Metalls giue *Orient* and *Fine Colours* in *Diſſolutions*; As *Gold* giueth an excellent Yellow; *Quicke-Siluer* an excellent Green; *Tin* giueth an excellent Azure: Likewiſe in their *Putrefactions*, or *Ruſts*; As *Vermilion*, *Verdegreaſe*, *Biſe*, *Cirrus*, &c. And likewiſe in their *Vitrifications*. The *Cauſe* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Poſture, and againe to retaine Part of their principall Spirit; Which two Things, (Equall Poſture, and Quicke Spirits) are required chiefly, to make *Colours* lightſome.

Experiment Solitary touching the *Orient Colours* in *diſſolution* of *Metalls*. 291

IT conduceth vnto *Long Life*, and to the more Placide motion of the Spirits, which thereby doe leſſe prey and conſume the Iuyce of the Body; Either that *Mens Actions be free and voluntary*; That nothing be done *Inuitâ Minervâ*, but *Secundum Genium*: Or on the other ſide, that the *Actions* of *Men be full of Regulation, and Commands within themſelues*: For then the Victory and Performing of the Command, giueth a good Diſpoſition to the Spirits, Eſpecially if there be a Proceeding from Degree to Degree; For then the Senſe of Victory is the greater. An example of the former of theſe, is in a Country life; And of the latter, in *Monkes* and *Philoſophers*, and ſuch as doe continually enioyne themſelues.

Experiment Solitary touching *Prolongation* of *Life*. 292

IT is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Emitation of Solution of Continuity: And of this *Appetite* there be many *Degrees*; But the moſt Remarkable, and fit to be diſtinguiſhed, are three. The firſt in *Liquors*; The ſecond in *Hard Bodies*: And the third in *Bodies Cleauing* or *Tenacious*. In *Liquors*, this *Appetite* is weake: Wee ſee in *Liquors*, the *Thredding* of them in *Stillicides*, (as hath beene ſaid;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles* and *Froth*. In the ſecond *Degree* or *Kinde*, this *Appetite* is ſtrong; As in *Iron*, in *Stone*, in *wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For ſuch *Bodies* doe partly follow the Touch of another Bodie; And partly ſticke and continue to themſelues; And therefore they roape, and draw themſelues in Threds; As we ſee in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleauing*, more or leſſe: And that they loue better the Touch of ſomewhat that is *Tangible*, than of *Aire*. For *water*, in ſmall quantity, cleaueth to any Thing that is Solid; And ſo would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaueth: But thoſe *Bodies* which are noted to be Clammie, and Cleauing, are ſuch, as haue a more indifferent *Appetite* (at once,) to follow another *Bodie*; And to hold to them-

Experiment Solitary touching *Appetite of Vnion* in *Bodies*. 293

themſelues, And therefore they are commonly *Bodies* ill mixed; And which take more pleaſure in a Forraine Body, than in preſeruing their owne *Conſiſtence*; And which haue little predominance in *Drought*, or *Moiſture*.

Experiment Solitary touching the *like Operations* of *Heat*, and *Time*. 294

Time, and *Heat*, are Fellowes in many Effects. *Heat* drieth Bodies, that doe eaſily expire; As Parchment, Leaues, Roots, Clay, &c. And, ſo doth *Time* or *Age* areſie; As in the ſame Bodies, &c. *Heat* diſſolueth and melteth Bodies, that keepe in their Spirits; As in diuers *Liquefactions*; And ſo doth *Time*, in ſome Bodies of a ſofter Conſiſtence: As is manifeſt in Honey, which by *Age* waxeth more liquid; And the like in Sugar; and ſo in old Oyle, which is euer more cleare, and more hot in Medicinable vſe. *Heat* cauſeth the Spirits to ſearch ſome Iſſue out of the Body; As in the *Volatility* of *Metalls*; And ſo doth *Time*; As in the *Ruſt* of *Metalls*. But generally *Heat* doth that in ſmall time, which *Age* doth in long.

Experiment Solitary touching the *differing Operations* of *Fire*, and *Time*. 295

SOme things which paſſe the *Fire* are ſofteſt at firſt, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards giue againe, and grow ſoft, as the Cruſt of Bread, Bisket, Sweet Meats, Salt, &c. The *Cauſe* is, for that in thoſe things which wax Hard with *Time*, the Worke of the *Fire* is a Kinde of *Melting*: And in thoſe that wax Soft with *Time*, (contrariwiſe,) the worke of the *Fire* is a Kinde of *Baking*; And whatſoeuer the *Fire* baketh, *Time* doth in ſome degree diſſolue.

Experiment Solitary touching *Motions* by *Imitation*. 296

Motions paſſe from one Man to another, not ſo much by Exciting Imagination; as by Imitation; Eſpecially if there be an Aptneſſe or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe paſſe from Man to Man; For that that cauſeth *Gaping* and *Stretching* is, when the Spirits are a little Heauy, by any Vapour, or the like. For then they ſtriue, (as it were,) to wring out, and expell that which loadeth them. So Men drowzie, and deſirous to ſleepe; Or before the Fit of an Ague; doe vſe to Yawne and Stretch; And doe likewiſe yeeld a *Voice* or *Sound*, which is an *Interiection* of *Expulſion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary touching *Infectious Diſeaſes*. 297

THere be ſome knowne *Diſeaſes* that are *infectious*; And Others that are not. Thoſe that are *infectious*, are; Firſt, ſuch as are chiefely in the *Spirits*; and not ſo much in the *Humours*; And therefore paſſe eaſily from Body to Body: Such are *Peſtilences*, *Lippitudes*, and ſuch like. Secondly, ſuch as *Taint* the *Breath*; Which wee ſee paſſeth manifeſtly from Man to Man; And not inuiſibly, as the *Affects* of the *Spirits* doe: Such are *Conſumptions* of the *Lungs*, &c. Thirdly, ſuch as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adiacent*;

Adiacent; Especially if they consist in an Vnctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprousie*. Fourthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they neuer infect, but by *Touch* only; And such a *Touch* also as commeth within the *Epidermis*; As the Venome of the *French Pox*; And the *Biting* of a *Mad Dog*.

Experiment Solitary touching the *Incorporation* of *Powders* and *Liquors*. 298

MOst *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Meale*; &c. The Reason is the Congruity of Bodies; which if it be more, maketh a perfecter Imbibition, and Incorporation; Which in most *Powders* is more betweene *Them* and *Water*, than betweene *them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment Solitary touching *Exercise* of the *Body*. 299

MVch *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for Others. If the Body be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much vpon *Exercise*. Likewise Men ought to beware, that they vse not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that helpeth to Excerne by *Sweat*; and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Euills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it be much, is no Friend to *Prolongation* of *Life*; Which is one cause, why *Women* liue longer than *Men*, because they stirre lesse.

Experiment Solitary touching *Meats*, that *induce Satietie*. 300

SOme *Food* we may vse *long*, and *much* without *Glutting*; As Bread, Flesh that is not fat, or ranke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomacke; Or possessing it with somewhat that is Astringent; And therefor Cold and Drie. But things that are *Sweet* and *Fat*, are more Filling: And doe swimme and hang more about the Mouth of the Stomacke; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and euer abateth the Appetite. Wee see also, that another *Cause* of *Saciety*, is an *Ouer-custome*; and of *Appetite* is *Noueltie*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To giue the Reason of the *Distaste* of *Saciety*, and of the *Pleasure*

ſure in *Noueltie*; and to diſtinguiſh not onely in Meats and Drinkes, but alſo in Motions, Loues, Company, Delights, Studies, what they be that *Cuſtome* maketh more grateſull; And what more tedious, were a large Field. But for *Meats*, the Cauſe is *Attraction*, which is quicker; and more excited toward that which is new, than towards that whereof there remaineth a Relliſh by former vſe. And (generally) it is a Rule, that whatſoeuer is ſomewhat Ingrate at firſt, is made Gratefull by *Cuſtome*; But whatſoeuer is too Pleaſing at firſt groweth quickly to *ſatiate*.

Experiment Solitary touching the preparation of Powders and Lepers.

Experiment Solitary touching Exercise of the Body.

Experiment Solitary touching Meats, that induce Sleepe.

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time* in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And euen in *Diuine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it : And for *Acceleration* of *Germination*, wee will referre it ouer, vnto the place, where wee shall handle the Subiect of *Plants*, generally ; And will now begin with other *Accelerations*.

Experiments in Consort touching the *Clarification* of *Liquors*, and the *Accelerating* thereof.

Liquors are (many of them) at the first, thicke and troubled : As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Herbs* expressed, &c. And by *Time* they settle and Clarifie. But to make them cleare before the *Time*, is a great Worke ; For it is a Spurre to Nature, and putteth her out of her pace : And besides, it is of good vse, for making *Drinkes*, and *Sauces*, Potable, and Seruiceable, speedily ; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquor*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquor*, with the *Tangible Parts* : For that euer representeth Bodies Cleare and Vntroubled,

301

bled. The third, by the *Refining* the *Spirit it ſelfe*, which thereby giueth to the *Liquor* more Splendor, and more Luſtre.

302 Firſt, for *Separation*; It is wrought by *Weight*; As in the ordinary Reſidence or Settlement of *Liquors*: By *Heat*: By *Motion*. By *Precipitation*, or *Sublimation*; (That is, a calling of the ſeuerall Parts, either vp, or downe, which is a kinde of *Attraction*:) By *Adheſion*; As when a Body more *Viſcous* is mingled and agitated with the *Liquor*; which Viſcous Body (afterwards ſeuered) draweth with it the groſſer parts of the *Liquor*: And Laſtly, By *Percolation* or *Paſſage*.

303 Secondly, for the *Euen Diſtribution* of the *Spirits*; It is wrought by *Gentle Heat*; And by *Agitation* or *Motion*; (For of *Time* wee ſpeake not, becauſe it is that, we would anticipate and repreſent:) And it is wrought alſo, by *Mixture* of ſome other *Body*, which hath a vertue to open the *Liquor*, and to make the *Spirits* the better paſſe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewiſe by *Heat*, By *Motion*; And by *Mixture* of ſome *Body* which hath *Vertue to attenuate*. So therefore (hauing ſhewne the *Cauſes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take theſe *Inſtances*, and *Trialls*.

305 It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the ſooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it laſting; yet withall they caſt vp ſome Spiſſitude: And this *Inſtance* is to bee referred to *Separation*.

306 On the other ſide, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Veſſell of *New Beere*; And take another Veſſell of *New Beere*, and Racke the one Veſſell from the *Lees*, and powre the *Lees* of the Racked Veſſell into the vnracked Veſſell, and ſee the Effect: This *Inſtance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in ſome Quantity of *Stale Beere* into it, and ſee whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Groſſer Parts, whereby they may fall downe into *Lees*. And this *Inſtance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are infuſed in *Liquor*, the more thicke and troubled the *Liquor* is; But the longer they bee decocted in the *Liquor*, the clearer it is. The Reaſon is plaine, becauſe in *Infuſion*, the longer it is, the greater is the Part of the Groſſe Body, that goeth into the *Liquor*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or ſetleth at the Bottome. And therefore the moſt Exact Way to *Clarifie* is; Firſt, to *Infuſe*, and then to take off the *Liquor* and *Decoct* it; as they doe in *Beere*, which hath *Malt* firſt Infuſed in the *Liquor*, and is afterwards boiled with the Hop. This alſo is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almoſt

almoſt to the very Necke: Let the Bottle be well ſtopped, leſt it flie out: And continue it, renewing the *Embers* euery day, by the ſpace of Ten Dayes; And then compare it with another Bottle of the ſame *Beere* ſet by. Take alſo Lime both *Quenched* and *Vnquenched*, and ſet the Bottles in them, *vt ſupra*. This *Inſtance* is referred, both to the *Euen Diſtribution*, and alſo to the *Refining* of the *Spirits* by *Heat*.

Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, vpon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leaue ſome Aire; For if the *Liquor* come cloſe to the Stopple, it cannot play, nor flower: And when you haue ſhaken them well, either way, powre the *Drink* into another Bottle, ſtopped cloſe, after the vſuall manner; For if it ſtay with much Aire in it, the *Drinke* will pall; neither will it ſettle ſo perfectly in all the Parts. Let it ſtand ſome 24. houres: Then take it, and put it againe into a *Bottle* with *Aire*, *vt ſupra*: And thence into a *Bottle ſtopped*, *vt ſupra*: And ſo repeat the ſame *Operation* for ſeuen dayes. Note that in the Emptying of one Bottle into another, you muſt doe it ſwiftly, leſt the *Drinke* pall. It were good alſo, to try it in a *Bottle* with a little Aire below the Necke, without Emptying. This *Inſtance* is referred to the *Euen diſtribution* and *Refining* of the *Spirits* by *Motion*. 310

As for *Percolation*, *Inward* and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adheſion*, with *Milke* put into *New Beere*, and ſtirred with it: For it may bee that the Groſſer Part of the *Beere* will cleaue to the *Milke*: The Doubt is, whether the *Milke* will ſeuer well againe; Which is ſoone tried. And it is vſuall in *Clarifying Ippocraſſe* to put in *Milke*, Which after ſeuereth and carrieth with it the *Groſſer Parts* of the *Ippocraſſe*, as hath beene ſaid elſewhere. Alſo for the better *Clarification* by *Percolation*, when they tun *New Beere*, they vſe to let it paſſe thorow a *Strainer*; And it is like, the finer the *Strainer* is, the cleerer it will be. 311

Experiments in Conſort touching *Maturation*, and the *Accelerating* thereof. And firſt touching the *Maturation* and *Quickning* of *Drinks*. And next touching the *Maturation* of *Fruits*.

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it ſelfe. It is of three Natures, The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impoſtumes* and *Vlcers*. This laſt wee referre to another Place, where wee ſhall handle *Experiments Medicinall*. There bee alſo other *Maturations*, as of *Metalls*, &c. whereof wee will ſpeake as Occaſion ſerueth. But wee will begin with that of *Drinkes*, becauſe it hath ſuch Affinity with the *Clarification* of *Liquors*.

For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digeſt more perfectly the Groſſer Parts: And it is effected partly, by the ſame meanes, that *Clarification* is (whereof wee ſpake before;) But then note, that an Extreme *Clarification* doth 312

ſpread the *Spirits* ſo Smooth, as they become Dull, and the *Drinke* dead, which ought to haue a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313 We ſee the *Degrees* of *Maturation* of *Drinkes*; In *Muſt*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Muſt* hath not the *Spirits* well Congregated; *Wine* hath them well vnited; ſo as they make the Parts ſomewhat more Oyly: *Vinegar* hath them Congregated, but more Ieiune, and in ſmaller Quantity; The greateſt and fineſt Spirit and Part being exhaled: For we ſee *Vinegar* is made by ſetting the Veſſell of *Wine* againſt the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

314 The *Refreſhing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So wee ſee that *Open weather* relaxeth the *Spirit*, and maketh it more liuely in *Motion*. Wee ſee alſo *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit* (ſo that it ſpirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windy. A *Pan* of *Coales* in the *Cellar* doth likewiſe good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, prouoketh it to worke againe: Nay, which is more (as ſome affirme) *A Brewing of New Beere*, ſet by *Old Beere*, maketh it worke againe. It were good alſo to *Enforce* the *Spirits* by ſome *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. Wee ſee *Creame* is *Matured*, and made to riſe more ſpeedily, by Putting in *Cold Water*; which, as it ſeemeth, getteth downe the *Whey*.

315 It is tried, that the *Burying* of *Bottles of Drinke* well ſtopped, either in *dry Earth*, a good depth; Or in the *Bottome* of a *well within water*; And beſt of all the *Hanging* of them in a *deepe Well* ſomewhat *aboue the water*, for ſome fortnights ſpace, is an Excellent *Meanes* of making *Drinke* freſh, and quicke: for the *Cold* doth not cauſe any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the reſt that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they Incorporate the Parts of the *Liquor* perfectly.

316 As for the *Maturation of Fruits*; It is wrought by the *Calling forth of the Spirits of the Body Outward*, and ſo *Spreading* them more *ſmoothly*: And likewiſe by *Digeſting*, in ſome degree, *the Groſſer Parts*; And this is Effected; by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Couered ouer with *Onions*; Couered ouer with *Crabs*; Cloſed vp in *Wax*; Shut in a *Box*, &c. There was alſo an *Apple* hanged vp in *Smoake*: Of all which the *Experiments* ſorted in this Manner.

318 After a Moneths Space, the *Apple* Encloſed in *wax*, was as Greene and Freſh as at the firſt putting in, and the *Kernels* continued White. The *Cauſe* is, for that all *Excluſion* of *Open Aire* (which is euer Predatory) maintaineth the Body in his firſt freſhneſſe, and Moiſture: But the Inconuenience

conuenience is, that it taſteth a little of the *wax*: Which I ſuppoſe, in a *Pomgranate*, or ſome ſuch thicke-coated *Fruit*, it would not doe.

The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Dry, Soft, Sweet, Yellow within. The *Cauſe* is, for that ſuch a degree of *Heat*, which doth neither Melt, nor Scorch, (For wee ſee that in a great *Heat*, a *Roaſt Apple*, Softneth and Melteth; And *Pigs feet*, made of Quarters of *Wardens*, ſcorch and haue a Skin of Cole) doth Mellow, and not Adure: The *Smoake* alſo maketh the *Apple* (as it were) ſprinkled with *Soot*, which helpeth to *Mature*. We ſee that in *Drying* of *Peares*, and *Prunes*, in the Ouen, and Remouing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intenſe degree of *Heat*. 319

The *Apples* couered in the *Lime* and *Aſhes*, were well *Matured*; As appeared both in their Yellowneſſe and Sweetneſſe. The *Cauſe* is, for that that *Degree of Heat* which is in *Lime*, and *Aſhes* (being a Smoothering *Heat*) is of all the reſt moſt Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the taſte of thoſe *Apples* was good; And therefore it is the *Experiment* fittelt for Vſe. 320

The *Apples*, *Couered* with *Crabs*, and *Onions*, were likewiſe well *Matured*. The Cauſe is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and ſpread them equally thorowout the *Body*; which taketh away Hardneſſe. So wee ſee one *Apple* ripeneth againſt another. And therefore in making of *Cider*, they turne the *Apples* firſt vpon a heape. So one *Cluſter* of *Grapes*, that toucheth another whileſt it groweth, ripeneth faſter; *Botrus contra Botrum citiùs matureſcit*. 321

The *Apples* in *Hay*, and the *Straw*, ripened apparantly, though not ſo much as the Other; But the *Apple* in the *Straw* more. The *Cauſe* is, for that the *Hay* and *Straw* haue a very low degree of *Heat*, but yet Cloſe and Smoothering, and which drieth not. 322

The *Apple* in the *Cloſe Box*, was ripened alſo: The *Cauſe* is, for that all Aire, kept cloſe, hath a degree of *Warmth*: As wee ſee in *Wooll*, *Furre*, *Pluſh*, &c. 323

Note that all theſe were Compared with another Apple; *of the ſame kinde, that lay of it ſelfe: And in Compariſon of that, were more Sweet, and more Yellow, and ſo appeared to be more Ripe.*

Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it vpon a Table hard: Wee ſee in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* preſently; Which is Nothing but the *Smooth Diſtribution* of the *Spirits* into the Parts: For the *Vnequall Diſtribution* of the *Spirits* maketh the Harriſhneſſe: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you ſhould *Rowle* them but gently, perhaps twice a day; And continue it ſome ſeuen dayes, it is like they would *Mature* more finely, and like vnto the *Naturall Maturation*. 324

Take an *Apple*, and cut out a Peece of the Top, and couer it, to ſee whether that *Solution of Continuity* will not haſten a *Maturation*; We ſee 325

that where a *Waſpe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape* or any *Fruit*, if it will ſweeten haſtily.

326 Take an *Apple*, &c. and pricke it with a *Pin* full of *Holes*, not deepe, and ſmeare it a little with *Sacke*, or *Cinnamon water*, or *Spirit of wine*, euery day for ten dayes, to ſee if the *Virtuall Heat* of the *wine*, or *Strong waters*, will not *Mature it*.

In theſe Trialls *alſo, as was vſed in the firſt, ſet another of the ſame* Fruits *by, to Compare them; And try them: by their* Yellowneſſe, *and by their* Sweetneſſe.

Experiment Solitary touching the *Making of Gold.*

The World hath beene much abuſed by the Opinion of *Making of Gold*: The *Worke* it ſelfe I Iudge to bee poſſible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Impoſture; And in the Theory, full of vnſound Imaginations. For to ſay, that *Nature* hath an Intention to make all Metals *Gold*. And that, if ſhe were deliuered from Impediments, ſhee would performe her owne Worke; And that, if the Crudities, Impurities, and Leproſities of *Metalls* were cured, they would become *Gold*; And that a little *Quantity* of the *Medicine*, in the Worke of *Proiection*, will turne a Sea of the *Baſer Metall* into *Gold*, by *Multiplying*: All theſe are but dreames: And ſo are many other Grounds of *Alchymy*. And to helpe the Matter, the *Alchymiſts* call in likewiſe many Vanities, out of *Aſtrology*; *Naturall Magicke*; Superſtitious Interpretations of *Scriptures*; Auricular *Traditions*; Faigned Teſtimonies of *Ancient Authors*; And the like. It is true, on the other ſide, they haue brought to light not a few profitable *Experiments*, and thereby made the world ſome amends. But wee, when wee ſhall come to handle the *Verſion* and *Tranſmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true Wayes and Paſſages of *Nature*, which may leade to this great Effect. And wee commend the wit of the *Chineſes*, who deſpaire of Making of *Gold*, but are Mad vpon the Making of *Siluer*: For certaine it is, that it is more difficult to make *Gold*, (which is the moſt Ponderous, and Materiate amongſt *Metalls*) of other *Metalls*, leſſe Ponderous, and leſſe Materiate; than (*viâ verſâ*) to make *Siluer* of *Lead*. or *Quick-Siluer*; Both which are more Ponderous than *Siluer*, So that they

need rather a further Degree of *Fixation*, than any *Condenſation*. In the meane time, by Occaſion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby Turning ſome of them into *Gold*: For wee conceiue indeed, that a perfect good *Concoction*, or *Diſgeſtion*, or *Maturation* of ſome *Metalls*, will produce *Gold*. And here we call to minde, that we knew a *Dutch-man*, that had wrought himſelfe into the beleefe of a great Perſon, by vndertaking that hee could make *Gold*: whoſe diſcourſe was, that *Gold* might be made; But that the *Alchymiſts* Ouer-fired the Worke: For (he ſaid) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore that hee would doe it with a great Lampe, that ſhould carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Deuice of the Lampe was ſolly; But the Ouer-firing now vſed; And the Equall Heat to bee required; And the Making it a Worke of ſome good Time; are no ill Diſcourſes.

Wee reſort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The Firſt is, that there be *vſed a Temperate Heat*; For they are euer *Temperate Heats* that *Diſgeſt*, and *Nature*: Wherein wee meane *Temperate*, according to the *Nature* of the *Subiect*; For that may bee *Temperate* to *Fruits*, and *Liquors*, which will not worke at all vpon *Metalls*. The Second is, that the *Spirits of the Metall bee quickened*, and the *Tangible Parts opened*: For without thoſe two Operations, the *Spirit* of the *Metall*, wrought vpon, will not bee able to diſgeſt the Parts. The Third is, that the *Spirits doe ſpread themſelues Euen*, and *moue not Subſultorily*; For that will make the Parts Cloſe and, Pham. And this requireth a Heat, that doth not riſe and fall, but continue as *Equall* as may bee. The Fourth is, that *no Part of the Spirit be emitted, but detained*: For if there be *Emiſſion* of *Spirit*, the Bodie of the *Metall* will bee Hard, and Churliſh. And this will bee performed, partly by the Temper of the fire; And partly by the cloſeneſſe of the Veſſell. The

Fifth

Fifth is, that there bee *Choyce made of the likelieſt and beſt Prepared Metall, for the Verſion*: For that will facilitate the worke. The Sixth is, that you giue *Time enough for the Worke*: Not to prolong Hopes (as the Alchymiſts doe;) but indeed to giue *Nature* a conuenient Space to worke in. Theſe Principles are moſt certaine, and true; we will now deriue a direction of *Trial* out of them; which may (perhaps) by further Meditation, bee improued.

327 Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* bee ſuch, as may keepe the *Metall perpetually Moulten*, and no more; For that aboue all importeth to the Worke. For the Materiall, take *Silver*, which is the *Metall* that in Nature Symbolizeth moſt with *Gold*; Put in alſo, with the *Silver*, a Tenth Part of *Quick-ſilver*, and a Twelfth Part of *Nitre*, by weight; Both theſe to quicken and open the Body of the *Metall*; And ſo let the Worke bee continued by the *Space of Six Moneths*, at the leaſt. I wiſh alſo, that there be, at ſome times, an Iniection of ſome *Oyled* Subſtance; Such as they vſe in the Recouering of *Gold*: which by Vexing with Separations hath beene made Churliſh: And this is to lay the Parts more Cloſe and Smooth, which is the Maine Worke. For *Gold* (as wee ſee) is the Cloſeſt (and therefore the Heavieſt) of *Metalls*: And is likewiſe the moſt Flexible, and Tenſible. Note, that to thinke to make *Gold* of *Quick-ſilver*, becauſe it is the heavieſt, is a Thing not to bee hoped; For *Quick-ſilver* will not endure the Mannage of the *Fire*. Next to *Silver*, I thinke *Copper* were fitteſt to be the *Materiall*.

Experiment Solitary touching the *Nature of Gold*.

328 *Gold* hath theſe *Natures*; *Greatneſſe of weight*; *Cloſeneſſe of Parts*; *Fixation*; *Pliantneſſe*, or *Softneſſe*; *Immunity from Ruſt*; *Colour*, or *Tincture of Yellow*. Therefore the Sure Way, (though moſt about,) to make *Gold*, is to know the *Cauſes* of the Seuerall *Natures* before rehearſed, and the *Axiomes* concerning the ſame. For if a Man can make a *Metall*, that hath all theſe *Properties*, Let Men diſpute, whether it be *Gold* or no?

Experiments in Conſort touching the *Enducing* and *Accelerating* of *Putrefaction*.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subiect of a very Vniuerſall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*: *Putrefaction* is the worke of the *Spirits* of *Bodies*, which euer are Vnquiet to Get *forth*, and *Congregate* with the *Aire*, and to enioy the *Sunbeames*: The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath fiue Differing *Operations*. It

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the *Spirits* be detained within the Body, and moue more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildly, there followeth *Diſgeſtion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* bee not meerely Detained, but Protrude a little, and that Motion be Confuſed, and Inordinate, there followeth *Putrefaction*; Which euer diſſolueth the Conſiſtence of the Body into much Inequality; As in *Fleſh*, *Rotten Fruits*, *Shining Wood*, &c. And alſo in the *Ruſt* of *Metals*. But if that Motion be in a certaine Order, there followeth *Viuification*, and *Figuration*; As both in *Liuing Creatures* bred of *Putrefaction*, and in *Liuing Creatures Perfect*. But if the *Spirits* iſſue out of the Body, there followeth *Deſiccation*, *Induration Conſumption*, &c. As in *Bricke*, Euaporation of *Bodies Liquid*, &c.

The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; Firſt by *Adding ſome Crude or Watry Moiſture*; As in Wetting of any Fleſh, Fruit, Wood, with *water*, &c. For contrariwiſe *Vnctuous* and *Oily Subſtances* preſerue. 329

The Second is by *Inuitation or Excitation*; As when a *Rotten Apple* lyeth cloſe to another *Apple*, that is *Sound*: Or when *Dung* (which is a Subſtance already Putrified) is added to other Bodies. And this is alſo notably ſeene in *Church-yards*, where they bury much; Where the Earth will conſume the *Corps*, in farre ſhorter time, than other Earth will. 330

The Third is, by *Cloſeneſſe*, and *Stopping*, which *detaineth* the *Spirits*, *in Priſon*, more than they would; And thereby irritateth them to ſeeke Iſſue; As in Corne, and Cloaths, which wax Muſty; and therefore Open Aire (which they call *Aer perflabilis*) doth preſerue: and this doth appeare more Euidently in *Agues*, which come (moſt of them,) of *Obſtructions*, and *Penning* the *Humours*; which there upon *Putrifie*. 331

The Fourth is, by *Solution of Continuity*; As we ſee an Apple will rot ſooner, if it be Cut or Pierced; And ſo will Wood, &c. And ſo the Fleſh of Creatures aliue, where they haue receiued any Wound. 332

The Fifth is, either by the *Exhaling*, or by the *Driuing backe* of the *principall Spirits*, which preſerue the Conſiſtence of the *Body*; So that when their Gouernment is Diſſolued, euery *Part* returneth to his Nature, or Homogeny. And this appeareth in *Vrine*, and *Blood*, when they coole, and thereby breake; It appeareth alſo in the *Gangrene*, or *Mortification* of *Fleſh*, either by *Opiates*, or by *Intenſe Colds*. I conceiue alſo the ſame Effect is in *Peſtilences*, for that the *Malignitie* of the *Infecting Vapour*, dannceth the *Principall Spirits*, and maketh them fly, and leaue their *Regiment*; And then the *Humours*, *Fleſh*, and *Secondary Spirits*, doe diſſolue and breake, as in an *Anarchy*. 333

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334 The Sixth is, when a *Forraine Spirit, Stronger and more Eager than the Spirit of the Body, entreth the Body*; As in the Stinging of Serpents. And this is the *Cauſe* (generally) that vpon all *Poyſons* followeth *Swelling*: And we ſee *Swelling* followeth alſo, when the *Spirits* of the *Body* it ſelfe, Congregate too much; As vpon *Blowes*, and *Bruiſes*; Or when they are *Pent in too much*, as in *Swelling* vpon *Cold*. And we ſee alſo, that the *Spirits* comming of *Putrefaction* of *Humours* in *Agues*, &c, which may be counted as *Forraine Spirits*, though they be bred within the Body, do Extinguiſh and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seuenth is, by ſuch a *Weake Degree of Heat, as ſetteth the Spirits in a little Motion, but is not able, either to diſgeſt the Parts, or to Iſſue the Spirits*, As is ſeen in Fleſh kept in a Roome that is not Coole: Whereas in a Coole and Wet Larder it will keepe longer. And we ſee, that *Viuification* (whereof *Putrefaction* is the *Baſtard Brother*,) is effected by ſuch Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eighth is, by the *Releaſing of the Spirits*; which before were cloſe kept by the Solidneſſe of their Couerture, and thereby their Appetite of Iſſuing checked; As in the *Artificiall Ruſts* induced by ſtrong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* haſteneth *Ruſt, or Putrefaction* of any thing, becauſe it ſofteneth the Cruſt, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and drie*; As wee ſee in the Mouldring of Earth in Froſts, and Sunne; And in the more haſtie Rotting of Wood, that is ſometimes wet, ſometimes drie.

338 The tenth is, by *Time, and the worke and Procedure of the Spirits themſelues*, which cannot keepe their Station; Eſpecially if they be left to themſelues, And there be not Agitation or Locall Motion. As wee ſee in Corne not ſtirred; And mens Bodies not exerciſed.

339 All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Fleſh*; the *Moulds* of *Orenges*, and *Limons*; which *Moulds* afterwards turne into Wormes, or more odious *Putrefactions*: And therefore (commonly,) proue to be of ill Odour. And if the Body be Liquid, and not apt to Putrifie totally; it will caſt vp a *Mother* in the Top; As the *Mothers* of *Diſtilled waters*.

340 *Moſſe* is a Kind of *Mould*, of the Earth, and Trees. But it may be better ſorted as a *Rudiment* of *Germination*; To which we referre it.

Experiments in Conſort touching *Prohibiting* and *Preuenting Putrefaction*.

It is an *Enquiry* of Excellent vſe, to Enquire of the *Meanes* of *Preuenting* or *Staying Putrefaction*; For therein conſiſteth the *Meanes* of *Conſeruation* of *Bodies*; For *Bodies* haue two Kindes of *Diſſolutions*; The one by *Conſumption*, and *Deficcation*; The other by *Putrefaction*. But as for the *Putrefactions*

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of the *Bodies* of *Men*, and *Liuing Creatures*, (as in Agues, Wormes, Conſumptions of the Lungs, Impoſtumes, and Vlcers both Inwards and Outwards,) they are a great *Part of Phyſicke*, and *Surgery*: And therefore wee will reſerue the *Enquiry* of them to the proper Place, where wee ſhall handle *Medicinall Experiments* of all Sorts. Of the reſt we will now Enter into an Enquiry: wherein much light may be taken, from that which hath beene ſaid, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Remouing that, which cauſed *Putrefaction*, doth Preuent and Auoid *Putrefaction*.

341 The firſt *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For ſo we ſee that Meat and Drinke will laſt longer, Vnputrified, or Vnſowred, in Winter, than in Summer: And wee ſee that Flowers, and Fruits, put in Conſeruatories of Snow, keepe freſh. And this worketh by the *Detention* of the *Spirits*, and *Conſtipation* of the *Tangible Parts*.

342 The ſecond is *Aſtriction*: For *Aſtriction* prohibiteth *Diſſolution*: As we ſee (generally) in *Medicines*, whereof ſuch as are *Aſtringents* doe inhibite *Putrefaction*: And by the ſame reaſon of *Aſtringency*, ſome ſmall Quantity of Oile of Vitrioll, will keepe freſh Water long from *Putrefying*. And this *Aſtriction* is in a Subſtance that hath a *Virtuall Cold*; And it worketh (partly) by the ſame Meanes that Cold doth.

343 The Third is, the Excluding of the *Aire*; And againe, the *Expoſing to the Aire*: For theſe Contraries, (as it commeth often to paſſe,) worke the ſame Effect, according to the Nature of the Subiect Matter. So we ſee, that *Beere*, or *Wine*, in Bottles cloſe ſtopped, laſt long; That the *Garners vnder Ground* keepe Corne longer than thoſe aboue Ground; And that *Fruit cloſed in Wax* keepeth freſh: And likewiſe *Bodies* put in *Honey*, and *Flower*, keepe more freſh: And *Liquors*, *Drinkes*, and *Iuyces*, with a little *Oyle* caſt on the Top, keepe freſh. Contrariwiſe, we ſee that *Cloth* and *Apparell*, not *Aired* doe breed Moathes, and Mould; and the Diuerſity is, that in *Bodies* that need *Detention* of *Spirits*, the *Excluſion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emiſſion* of *Spirits*, to diſcharge ſome of the Superfluous Moiſture, it doth hurt, for they require *Airing*.

344 The Fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Reſt*; For the Subtill *Motion*, which *Putrefaction* requireth, is diſturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As wee ſee that Turning ouer of Corne in a Garner; Or Letting it runne like an Houre-glaſſe, from an vpper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens Bodies, Exerciſe hindereth *Putrefaction*; And contrariwiſe *Reſt*, and want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perſpiration, is ſtaied,) further *Putrefaction*; As wee partly touched a little before.

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345 The Fifth is, the *Breathing forth of the Aduentitious Moiſture in Bodies*; For as *Wetting* doth haſten *Putrefaction*; So *Conuenient Drying*, (whereby the more *Radicall Moiſture* is onely kept in,) putteth backe *Putrefaction*: So we ſee that *Herbs*, and *Flowers*, if they be dried in the Shade; Or dried in the hot Sunne, for a ſmall time keepe beſt. For the *Emiſſion* of the *Looſe* and *Aduentitious Moiſture*, doth betray the *Radicall Moiſture*; And carrieth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a Strong *Spirit* likewiſe preſerueth, and a Weake or Faint *Spirit* diſpoſeth to *Corruption*. So wee finde that Salt water corrupteth not ſo ſoone as Freſh: And Salting of Oiſters, and Powdring of Meat, keepeth them from *Putrefaction*. It would bee tried alſo, whether *Chalke* put into *Water*, or *Drinke*, doth not preſerue it from *Putrefying*, or ſpeedy Souring. So we ſee that *Strong Beere* will laſt longer than ſmall; And all Things, that are hot and Aromaticall, doe helpe to preſerue Liquors, or Powders, &c. Which they doe, as well by Strengthning the *Spirits*, as by Soaking out the looſe *Moiſture*.

347 The Seuenth is, *Separation of the Cruder Parts*, and thereby making *the Body more Equall*; for all vnperfect Mixture is apt to *Putrefie*; And Watry Subſtances are more apt to *Putrefie*, than Oyly. So wee ſee diſtilled Waters will laſt longer than Raw Waters; And things that haue paſſed the Fire, doe laſt longer, than thoſe that haue not paſſed the Fire; As Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that Part, where the Putrefaction beginneth*; Which is (commonly) the *Looſe and Watry Moiſture*; Not only for the Reaſon before giuen, that it prouoketh the *Radicall Moiſture* to come forth with it; But becauſe being detained in the Body, the *Putrefaction* taking hold of it, infecteth the reſt: As we ſee in the *Embalming dead Bodies*: And the ſame Reaſon is of *Preſeruing Herbs*, or *Fruits*, or *Flowers*, in *Bran*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet*: For ſuch *Bodies* are leaſt apt to *Putrefie*, the *Aire* working little vpon them: And they not putrefying preſerue the reſt. And therefore wee ſee *Syrups*, and *Ointments*, will laſt longer, than *Iuyces*.

350 The Tenth is, the *Commixture of ſomewhat that is Dry*; For *Putrefaction* beginneth firſt from the *Spirits*; And then from the *Moiſture*: And that that is drie is vnapt to putrefie: And therefore Smoake preſerueth Fleſh; As wee ſee in Bacon, and Neats-Tongues, and Martlemas Beeſe, &c.

351 The Opinion of ſome of the *Ancients*, that *Blowne Aires* doe preſerue Bodies, longer than other *Aires*, ſeemeth to Mee Probable; For that the *Blowne Aires*, being Ouer-charged and Compreſſed, will hardly receiue the Exhaling of any Thing, but rather repulſe it. It was tried in a *Blowne Bladder*, whereinto Fleſh was put, and likewiſe a Flower, and it ſorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther further *Putrefaction*: The way were therefore, to blow ſtrongly, with a Paire of Bellowes, into a Hogſhead, putting into the Hogſhead (before) that which you would haue preſerued; And in the inſtant that you withdraw the Bellowes, ſtop the Hole cloſe.

Experiment Solitary touching *Wood Shining* in the *Darke*. 352

THe *Experiment* of *Wood* that *Shineth* in the *Darke*, we haue diligently driuen, and purſued: The rather, for that of all Things, that giue Light here below, it is the moſt durable; And hath leaſt Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* ſhineth onely while it is in Scraping; And *Salt-water* while it is in Daſhing, *Glow-wormes* haue their Shining while they liue, or a little after. Onely *Scales* of *Fiſhes* (Putrified) ſeeme to bee of the ſame Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* ſorted thus. 1. The *Shining* is in ſome Peeces more *Bright*; in ſome more *Dimme*; but the moſt *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that haue beene tried to ſhine, are chiefly *Sallow* and *Willow*; Alſo the *Aſh*, and *Haſle*; It may bee, it holdeth in others. 3. Both *Roots*, and *Bodies* doe ſhine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in ſome Peeces *White*, in ſome Peeces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the moſt part) ſomewhat *Soft*, and *Moiſt* to feele to; But ſome was found to bee *Firme*, and *Hard*; So as it might bee figured into a Croſſe, or into Beads, &c. But you muſt not looke to haue an Image, or the like, in any thing that is Light ſome; For euen a face in Iron red Hot will not bee ſeene, the Light confounding the ſmall differences of Light ſome and Dark ſome, which ſhew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* beganne alſo to *Shine*, being laid abroad in the Dew; So as it ſeemeth the Putrefaction ſpreadeth. 7. There was other dead wood of like kinde, that was *laid abroad*, which *Shined* not at the firſt; but after a Nights lying abroad began to *Shine*. 8. There was other *Wood*, that did *Firſt ſhine*: And being laid dry in the Houſe, within fiue or ſix dayes, *Loſt* the *ſhining*; And laid abroad againe, *Recouered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seuen night, loſt their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boaring of Holes*, in that kinde of Wood, and then laying it abroad, ſeemeth to conduce to make it *Shine*: The *Cauſe* is, for that all *Solution* of *Continuity* doth helpe on *Putrifaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut *downe aliue*, but ſuch as was *Rotted*, both in Stocke, and Root, while it grew. 12. Part of the *Wood* that *Shined*, was *ſteeped in Oyle*, and retained the *Shining* a Forthnight. 13. The like ſucceeded in ſome *Steeped* in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* bee *laid abroad euery Night*, and *taken in* and *Sprinkled* with *Water* in the *Day*, is not yet tried. 15. Triall was

made of *laying it abroad in Froſty weather*, which hurt it not. 16. There was a great *Peece* of a *Root* which did ſhine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a dry Roome, it got a *Shining*.

Experiment Solitary touching the *Acceleration of Birth*. 353

THe *Bringing forth* of *Liuing Creatures* may bee *accelerated* in two Reſpects: The one, if the *Embryon ripeneth* and perfecteth ſooner: The other if there be ſome Cauſe from the *Mothers Body*, of *Expulſion* or Putting it downe: whereof the Former is good, and argueth ſtrength; The Latter is ill, and commeth by Accident or Diſeaſe. And therefore the Ancient *Obſeruation* is true, that the *Childe borne in the ſeuenth Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the moſt part) die. But the *Cauſe* aſſigned is Fabulous; Which is, that in the Eighth Moneth, ſhould bee the Returne of the Reigne, of the *Planet Saturne*: which (as they ſay) is a *Planet* Maligne; whereas in the Seuenth is the Reigne of the *Moone*, which is a Planet Propitious. But the true *Cauſe* is, for that where there is ſo great a Preuention of the Ordinary time, it is the *Luſtineſſe* of the *Childe*; But when it is leſſe, it is ſome *Indiſpoſition* of the *Mother*.

Experiment Solitary touching the *Acceleration* of *growth* and *Stature*. 354

TO *Accelerate Growth* or *Stature*, it muſt proceed; Either from the *Plenty* of the *Nouriſhment*; Or from the *Nature* of the *Nouriſhment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the firſt, *Exceſſe* of *Nouriſhment* is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Heighth. And you may take an Experiment from *Plants*, which, if they ſpread much, are ſeldome tall. As for the *Nature* of the *Nouriſhment*; Firſt, it may not bee too *Dry*; And therefore Children in Dayry Countries doe wax more tall, than where they feed more vpon Bread, and Fleſh. There is alſo a receiued Tale; That Boyling of *Daſie Roots* in *Milke* (which it is certaine are great Driers) will make *Dogs* little. But ſo much is true, that an *Ouer-drie Nouriſhment* in Childhood putteth backe Stature. Secondly, the *Nouriſhment* muſt be of an *Opening Nature*; For that Attenuateth the Iuyce, and furthereth the Motion of the Spirits, vpwards. Neither is it without Cauſe, that *Xenophon*, in the *Nouriture* of the *Perſian Children*, doth ſo much commend their Feeding vpon *Cardamon*; which (hee ſaith) made them grow better, and bee of a more Actiue Habit. *Cardamon* is in Latine *Naſturtium*; And with vs *Water-Creſſes*; Which, it is certaine, is an Herbe, that whileſt it is young, is Friendly to Life. As for the *Quickning* of *Naturall Heat*, it muſt bee done chiefly with *Exerciſe*; And therefore (no doubt) much Going to Schoole, where they ſit ſo much, hindereth the *Growth* of *Children*; whereas Countrey People, that goe not to Schoole, are commonly of better Stature. And againe Men muſt beware, how they giue *Children*, any thing that is *Cold* in Operation; For euen *Long-Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tried, that a Whelpe, that hath beene fed with *Nitre* in *Milke*, hath become

come very little; but extreme liuely: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason, For *Heat* is requisite to Growth: But after a Man is come to his Middle Age, *Heat* consumeth the Spirits; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

There be two *Great Families* of *Things*: You may terme them by seuerall Names; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two;) *Inflammable* and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For wee see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Liuing Creatures*, there is *Water* and *Oyle*: In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they bee vnlike in the Primitiue Differences of Matter, yet they seeme to haue many Consents: For *Mercury* and *Sulphure* are principall Materialls of *Metalls*; *Water* and *Oyle* are principall Materials of *Vegetables* and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both haue Quicknesse of Motion, and Facility of Cession, much alike: And the *Interstellar* Skie, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water*, or *Watry Iuyce*, into *Oyle* or *Oyly* Iuyce: Greater in Nature, than to turne *Siluer*, or *Quick-Siluer*, into *Gold*.

Experiments in Consort, touching *Sulphur* and *Mercury*, two of *Paracelsus* Principles

The Instances we haue, wherein *Crude* and *watry* Substance turneth into *Fat* and *Oyly*, are of foure kinds. First in the *Mixture* of *Earth* and *Water*, which mingled by the helpe of the Sun, gather a Nitrous Fatnesse, more than either of them haue seuerally; As wee see, in that they put forth *Plants*, which need both Iuyces. 355

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Liuing Creatures*; Whereof *Plants* turne the Iuyce of meere *Water* and *Earth*, into a great deale of *Oyly Matter*: *Liuing Creatures*, 356

tures, though much of their *Fat* and *Flesh*, are out of *Oyly Aliments*, (as *Meat* and *Bread*) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time.

357 The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which haue a kinde of *Fatnesse* or *Oyle*.

358 The Fourth is in the *Dulcoration* of some *Metalls*; as *Saccharum Saturni*, &c.

359 The Intention of *Version* of *Water* into a more *Oily Substance*, is by *Disgestion*; For *Oile* is almost Nothing else but *Water disgested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Prouocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily* or *Disgested*; For they will somewhat Communicate their Nature with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Disgested*; As in *Plants*, and *Liuing Creatures*, whose Nourishment is far more Crude than their Bodies: But this *Disgestion* is by a great Compasse, as hath beene said. As for the more full handling of these two Principles, whereof this is but a Taste; (the Enqury of which is one of the Profoundest Enquiries of Nature) Wee leaue it to the *Title* of *Version* of *Bodies*; And likewise to the *Title* of the *First Congregations* of *Matter*; Which like a Generall Assemblie of Estates, doth giue Law to all *Bodies*.

Experiment Solitary touching *Chameleons*.

360 A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head vnproportionably big; His Eyes great: Hee moueth his Head without the writhing of his Necke (which is inflexible) as a *Hogge* doth: His Backe crooked; His Skin Spotted with little Tumours, lesse Eminent nearer the Belly; his Taile slender, and long: On each Foot he hath fiue Fingers; three on the Outside, and two on the Inside; His Tongue of a Maruellous Length in respect of his Body, and hollow at the end; Which hee will launch out to prey vpon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If hee bee laid vpon Greene, the Greene predominateth; If vpon Yellow, the Yellow; not so if he be laid vpon Blew, or Red, or White; Onely the Greene Spots receiue a more Orient Lustre: Laid vpon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. Hee feedeth not onely vpon Aire (though that bee his principall Sustenance;) For sometimes hee taketh *Flies*, as was said; Yet some that haue kept *Chameleons* a whole yeere together, could neuer perceiue that euer they fed vpon any Thing else but Aire; And might obserue their Bellies to swell after they had exhausted the Aire, and closed their Iawes; Which they open commonly

monly againſt the Rayes of the Sunne. They haue a fooliſh Tradition in *Magicke*, that if a *Chamelion* be burnt vpon the Top of a Houſe, it will raiſe a Tempeſt; Suppoſing (according to their vaine Dreames of *Sympathies*) becauſe he nouriſheth with Aire, his Body ſhould haue great vertue to make Impreſſion vpon the Aire.

Experiment Solitary touching *Subterrany Fires*. 361

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that thoſe *Flames* are cleere; and caſt not forth ſuch Smoake, and Aſhes, and Pummice, as *Mountaine Flames* do. The Reaſon (no doubt) is, becauſe the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which caſt *Flame*. There be alſo ſome *Blind Fires*, vnder *Stone*, which flame not out, but *Oile* being powred vpon them, they flame out. The Cauſe whereof is, for that it ſeemeth, the *Fire* is ſo choaked, as not able to remoue the Stone, it is *Heat*, rather than *Flame*; Which neuertheleſſe is ſufficient to Enflame the *Oile*.

Experiment Solitary touching *Nitre*. 362

IT is reported, that in ſome *Lakes*, the *water* is ſo *Nitrous*, as if Foule Cloathes be put into it, it ſcoureth them of it ſelfe: And if they ſtay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, becauſe it is a *Body Cold*; And wee ſee *warme Water* ſcoureth better than *Cold*. But the Cauſe is, for that it hath a Subtill Spirit, which ſeuereth and diuideth any thing that is foule, and Viſcous, and ſticketh vpon a Body.

Experiment Solitary touching *Congealing of Aire*. 363

TAke a *Bladder*, the greateſt you can get; Fill it full of Wind, and tye it about the Necke with a ſilke thred waxed; And vpon that put likewiſe Wax very cloſe; So that when the Necke of the *Bladder* drieth, no *Aire* may poſſibly get in, or out. Then bury it three or foure foot vnder the *Earth*, in a *Vault*, or in a *Conſeruatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after ſome Fortnights diſtance, ſee whether the *Bladder* be ſhrunke: For if it be, then it is plain that the *Coldneſſe* of the *Earth*, or *Snow*, hath Condenſed the *Aire*, and brought it a Degree nearer to *water*: Which is an *Experiment* of great Conſequence.

Experiment Solitary touching *Congealing of Water into Cryſtall*. 364

IT is a report of ſome good credit, that in *Deepe Caues*, there are *Pendſile Cryſtall*, and *Degrees* of *Cryſtall* that drop from aboue; And in ſome other, (though more rarely) that riſe from below. Which though it be chiefly the worke of Cold, yet it may bee, that Water, that paſſeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and become Solid, than Water of it ſelfe. Therefore Triall would be made, to lay a Heape of Earth, in great Frolts, vpon a Hollow Veſſell, putting a Canuaſe betweene, that it falleth not in. And powre Water vpon it, in ſuch Quantity, as will be ſure to ſoake thorow; And ſee whether it will not make an harder Ice in the bottome of the Veſſel,

and leſſe apt to diſſolue, than ordinarily. I ſuppoſe alſo, that if you make the Earth narrower at the bottome, than at the Top, in faſhion of a Sugar Loafe Reuerſed, it will helpe the Experiment. For it will make the Ice, where it Iſſueth, leſſe in bulke; and euermore Smalneſſe of Quantity is a Helpe to *Verſion*.

Experiment Solitary touching *Preſerving* of *Roſe-leaues* both in *Colour* & *ſmell*.

365

TAke *Damaske Roſes*, and pull them; Then drie them vpon the Top of an Houſe, vpon a Lead or Tarras, in the hot Sunne, in a cleere day, betweene the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet *Dry Earthen Bottle*, or a *Glaſſe*, with narrow Mouthes, ſtuffing them cloſe together, but without Bruiſing: Stop the *Bottle* or *Glaſſe* cloſe, and theſe *Roſes* will retaine, not onely there ſmell Perfect, but their Colour freſh, for a yeare at leaſt. Note, that Nothing doth ſo much deſtroy any Plant, or other Body, either by *Putrefaction*, or *Arefaction*, as the *Aduentitious Moiſture*, which hangeth looſe in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moiſture*, along with it, when it ſelfe goeth forth. And therefore in *Liuing Creatures*, Moderate Sweat doth preſerue the Iuice of the Body. Note that theſe *Roſes*, when you take them from the *Drying*, haue little or no *Smell*, So that the Smell is a Second *Smell*, that iſſueth out of the *Flower* afterwards.

Experiments in Conſort touching the *Continuance* of *Flame*.

366

THe *Continuance* of *Flame*, according vnto the diuerſity of the *Body Enflamed*, & other Circumſtances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almoſt) of a Momentany Laſting, yet it receiueth the More, and the Leſſe: we will firſt therefore ſpeake (at large) of *Bodies Enflamed*, wholly, and immediatly, without any *wicke* to helpe the *Inflamemation*. A Spoonfull of *Spirit* of *Wine*, a little heated, was taken, and it burnt as long as came to 116 Pulſes. The ſame Quantity of *Spirit* of *wine*, Mixed with the Sixth Part of a Spoonfull of *Nitre*, burnt but to the ſpace of 94. Pulſes. Mixed with the like Quantity of *Bay ſalt*, 83. Pulſes. Mixed with the like Quantity of *Gunpowder*, which diſſolued into a Blacke water, 110. Pulſes. A Cube, or Peller of *Yellow Wax*, was taken, as much as halfe the *Spirit* of *wine*, and ſet in the Middeſt, and it burnt onely to the ſpace of 87. Pulſes; Mixed with the Sixth Part of a ſpoonfull of *Milke*, it burnt to the ſpace of 100. Pulſes; And the *Milke* was crudled. Mixed with the Sixth Part of a ſpoonefull of *water*, it burnt to the ſpace of 86. Pulſes; With an *Equall Quantity* of *Water*, onely to the ſpace of 41. Pulſes. A Small *Pebble* was laid in the Middeſt; and the *Spirit* of *Wine* burnt to the ſpace of 94. Pulſes. A Peece of *Wood*, of the bigneſſe of an Arrow, and about a Fingers length, was ſet vp in the Middeſt, and the *Spirit* of *Wine* burnt to the ſpace of 94. Pulſes. So that the *Spirit* of *wine Simple*, endured the longeſt; And the *Spirit* of *wine* with the *Bay Salt*, and the *Equall Quantity* of *water*, were the ſhorteſt.

367

Conſider well, whether the more ſpeedy *Going forth of the flame*, bee caused,

caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Auersion* thereof to take *Flame*; Which will appeare by the Quantity of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it seemeth clearely to be the latter; For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that *Spirit* of *Wine* burned, till it goe out of it selfe, will burne no more, And tasteth nothing so hot in the Mouth, as it did; No nor yet sower, (as if it were a degree towards *Vineger*,) which *Burnt Wine doth*; but flat and dead.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolued in the burning, and yet did not incorporate it selfe, with the *Spirit* of *Wine*, to produce one *Flame*; but wheresoeuer the *Wax* flpated, the *Flame* forsooke it, till at last it spread all ouer, and put the *Flame* quite out. 368

The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*, are Things of Discouery, and not of Vse: But now wee will speake of the *Continuance* of *Flames*, such as are vsed for *Candles*, *Lampes*, or *Tapers*; consisting of *Inflammable Matters*, and of a *Wicke* that prouoketh *Inflamation*. And this importeth not only Discouery, but also Vse and Profit; For it is a great Sauing, in all such Lights, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a Candle, and *Wax Mixed* seuerally into Candle-stuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vitæ*, *Milk*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Euery of these bearing a Sixth Part to the *Wax*; And euery of these *Candles mixed*, being of the same Weight and Wicke with the *Wax Pure*, proued thus in the Burning, and Lasting. The swiftest in Consuming was that with *Saw-dust*; Which first burned faire, till some part of the *Candle* was consumed, and the Dust gathered about the Snaste; But then it made the Snaste bigge, and long, and to burne duskishly, and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in Swiftnesse, were the *Oile*, and *Butter*, which consumed, by a Fifth part, swifter than the *Pure Wax*. Then followed in Swiftnesse the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an Eighth Part longer than the *Cleare Wax*. Then followed the *Aqua-vitæ*, which lasted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milk*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* slowest. And in these foure last, the *wicke* would spit forth little Sparkes. For the *Nitre*, it would not hold lighted aboue some Twelue Pulses; But all the while it would spit out Portions of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same time with the *Nitre*; But then after a little while, it would harden and cake about the Snaste; So that the Mixture of *Bay-Salt* with *Wax*, will win an Eighth part of the time of lasting, and the *Water* a Fifth. 369

After the Seuerall *Materialls* were tried, Triall was likewise made of seuerall *wickes*; As of Ordinary *Cotton*; *Sowing Thred*; *Rush*; *Silke*, *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till 370

they came to the *Wax*, and then goe out: of the Other Three, the *Threed* consumed faster than the *Cotton*, by a Sixth part of Time: The *Cotton*, next: Then the *Rush* consumed slower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike; and the *Rush* much lesse, and dimmer. *Quære*, whether *wood*, and *wickes* both, as in *Torches*, consume faster, than the *Wickes Simple*.

371 We haue spoken of the Severall *Materialls*, and the Severall *wickes*: But to the *lasting* of the *Flame*, it importeth also; Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Housewives*, to make their *Candles* burne the longer, vse to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the slower: In so much, as by this meanes, they will outlast other *Candles*, of the same Stuffe, almost Halfe in Halfe. For *Bran* and *Flower* haue a Vertue to Harden: So that both Age, and lying in the Bran, doth helpe to the Lasting. And we see that *Wax Candles* last longer than *Tallow Candles*, because *wax* is more firme, and hard.

372 The *Lasting* of *Flame* also dependeth vpon the *easie Drawing* of the *Nourishment*; As we see in the *Court* of *England*, there is a Sertuice which they call *All-nights*; which is (as it were) a great Cake of Wax, with the Wicke in the Middest; whereby it commeth to passe, that the Wicke fetcheth the Nourishment further off. We see also that *Lamps* last longer, because the Vessell is farre broader, than the Bredth of a Taper, or Candle.

373 Take a *Turreted Lampe* of *Tinne*, made in the forme of a Squire; The Height of the *Turret* being thrice as much, as the length of the lower part whereupon the *Lampe* standeth: Make only one Hole in it, at the End of the Returne furthest from the *Turret*. Reuerse it, and fill it full of *Oile*, by that Hole; And then set it vpright againe; And put a Wicke in at the Hole; And lighten it: You shall finde that it will burne slow, and a long time. Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment afarre off*. You shall finde also, that as the *Oile* wasteth, and descendeth, so the Top of the *Turret*, by little and little, filleth with Aire; which is caused by the Rarefaction of the *Oile* by the Hear. It were worthy the Obseruation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to haue the *Lampe* made, not of *Tinne*, but of *Glasse*, that you may see how the Vapour, or Aire gathereth, by degrees, in the Top.

374 A Fourth Point, that importeth the *lasting* of the *Flame*, is the *Closenesse* of the *Aire*, wherein the *Flame* burneth. We see, that if *Wind* bloweth vpon a *Candle*, it wasteth apace. We see also, it lasteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lampes*, and *Candles*, that haue burnt a very long time, in *Caues*, and *Tombs*.

375 A fifth Point, that importeth the *Lasting* of the *Flame*, is the *Nature*

of

of the *Aire*, where the *Flame* burneth; whether it bee Hot or Cold, Moist or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorcheth in Frosty weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceiue) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moist*, doth in a Degree quench the *Flame*: (As we see *Lights* will goe out in the *Damps* of *Mines*:) And howsoeuer maketh it burne more dully: And so helpeth the *Continuance*.

Experiments in Consort, touching *Burialls* or *Infusions* of diuers *Bodies* in *Earth*.

376 *Vrialls* in *Earth* serue for *Preseruation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Portellane*, &c. And the like you may doe for *Conseruation*, if the *Bodies* be Hard and Solid; As Clay, Wood, &c. But if you intend *Preseruation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must *vault the Earth*, whereby it may hang ouer them, and not touch them: For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserue them; Except the *Earth* be very Drie, and Sandie.

377 An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Forthnights Space, foure foot deepe within the Earth, though it were in a Moist Place, and a Rainie Time, yet came forth, no waies Mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Iuyce somewhat flatted. But with the *Buriall* of a Forthnight more they became putrified.

378 A *Bottle* of *Beere*, *buried* in like manner, as before, became more liuely, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more liuely, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and liuely, if not better, than before.

379 It were a profitable *Experiment*, to preserue *Orenges*, *Limons*, and *Pomoranates*, till Summer; For then their Price will bee mightily increased. This may be done, if you put them in a Pot or Vessell, well couered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conseruatory* of *Snow*. And generally, whosoeuer will make *Experiments* of *Cold*, let him be prouided of three Things, A *Conseruatorie* of *Snow*; A good *large Vault*, twenty foot at least vnder the Ground; And a *Deepe well*.

380 There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that haue lost their Colours, may be recouered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But vpon Triall of Six weekes *Buriall*, there followed no effect. It were good to trie it,

in

in a *Deepe Well*; or in a *Conseruatory* of *Snow*, where the Cold may be more Constringent; And so make the *Body* more vnited, and thereby more Resplendent.

Experiment Solitary touching the *Affects* in *Mens Bodies* from *Seuerall Winds*. 381

Mens Bodies are heauier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The *Cause* is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt and wax fluide, and so flow into the Parts; As it is seene in *Wood*, and other *Bodies*; which, when the *Southerne winds* blow, doe swell. Besides, the Motion and Actiuity of the Body consisteth chiefly in the Sinewes, which, when the *Southerne wind* bloweth, are more relax.

Experiment Solitary touching *Winter* and *Summer Sicknesses*. 382

IT is commonly seene, that more are *Sicke* in the *Summer*, and more *Dye* in the *winter*; Except it be in *Pestilent Diseases*, which commonly reigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefely by *Heat*; But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is prouoked, more Easily: As for *Pestilent Diseases*, the Reason why most Die of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most Danger in the *winter*.

Experiment Solitary touching *Pestilentiall Season*. 383

THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Vpon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there haue beene great *Plagues* in *Drie Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake vp in the *Summer-moneths*, when the *weather* is *Hot* and *Dry*.

Experiment Solitary touching an *Error receiued* about *Epidemicall Diseases*. 384

MAny *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the *Cause* is falsly imputed to the *Constitution* of the *Aire*, at *that time*, when they *breake forth*, or *reigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Obseruations, of the *Diseases*, that ensue vpon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment Solitary touching the *Alteration* or *Preseruation of Liquors* in *Wells*, or *deepe Vaults*. 385

TRiall hath been made, with *Earthen Bottles* well stopped, hanged in a *well* of Twenty Fathome deep, at the least; And some of the *Bottles* haue beene let downe into the *Water*, some others haue hanged aboue, within about a fathome of the *water*, And the *Liquors* so tried haue beene, *Beere*, (not New, but Ready for drinking,) and *wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *wine*, (as well within *Water*, as aboue,) haue not been palled or deaded at all; But

as

as good or somewhat better, than *Bottles* of the same *Drinkes*, and Staleness, kept in a *Cellar*. But those which did hang aboue *Water*, were apparently the best; And that *Beere* did flower a little; whereas that vnder *water* did not, though it were Fresh. The *Milke* sowred, and began to Putrefie. Neuertheless it is true, that there is a *Village* neere *Blois*, where in *Deepe Caues* they doe thicken *Milke*; In such sort that it becommeth very pleasant; Which was some *Cause* of this Triall of Hanging *Milke* in the *Well*: But our proofe was naught: Neither doe I know, whether that *Milke* in those *Caues*, bee first boyled. It were good therefore to try it with *Milke* Sodden, and with Creame; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolued. It were good also to try the *Beere*, when it is in *Wort*, that it may be seene, whether the *Hanging* in the *well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiment Solitary touching *Stutting*. 386

Diuers, we see, doe *Stut*. The *Cause* may be, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to moue. And therefore wee see, that *Naturalls* doe generally *Stut*; And wee see that in those that *Stut*, if they drinke Wine moderately, they *Stut* lesse, because it heateth: And so wee see, that they that *Stut*, doe *Stut* more in the first Offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinesse* of the *Tongue*; which likewise maketh it lesse apt to moue, as well as *Cold*; For it is an Affect that commeth to some *wise* and *Great Men*; As it did vnto *Moses*, who was *Lingua prapedita*; And many *Stutters* (we finde) are very *Cholericke Men*; *Choler* Enducing a *Drinesse* in the *Tongue*.

Experiments in Consort, touching *Smels*. 387

Smells, and other *Odours*, are Sweeter in the Aire, at some Distance, than neere the Nose; As hath beene partly touched heretofore. The *Cause* is double; First the finer Mixture, or Incorporation of the *Smell*: For wee see that in *Sounds* likewise, they are Sweetest, when wee cannot heare euery Part by it selfe. The other *Reason* is, for that all *Sweet Smells* haue ioyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more Spirituall, is Perceiued; And the *Earthy* reacheth not so farre.

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Sweet Smells are most forcible, in *Dry Substances*; when they are *Broken*; And so likewise in *Orenges*, or *Limons*, the Nipping of their Rinde, giueth out their *Smell* more: And generally, when *Bodies* are *Moued* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waued. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some Degree) in the Mouing; But in this last, there is a Concurrence of the Second *Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster vpon vs.

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The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaues smell* not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pinkes*, *Woodbines*, *Vine-*

Vine-flowers, Apple-Bloomes, Lime-Tree Bloomes, Beane-Bloomes, &c. The *Cauſe* is, for that where there is Heat and ſtrength enough in the *Plant*, to make the *Leaues Odorate*, there the *Smell* of the *Flower* is rather Euanide and Weaker, than that of the *Leaues*; As it is in *Roſe-mary-Flowers, Lauender-Flowers*, and *Sweet-Brier-Roſes*. But where there is leſſe Heat, there the *Spirit* of the *Plant* is diſgeſted and refined, and ſeuered from the groſſer Iuice, in the *Efflorescenſe*, and not before.

390 Moſt *Odours* ſmell beſt, *Broken* or *Cruſht*, as hath beene ſaid: But *Flowers Preſſed* or *Beaten*, doe leeſe the Freſhneſſe and Sweetneſſe of their *Odour*. The *Cauſe* is, for that when they are *Cruſhed*, the Groſſer and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in ſtronger *Odours* there are no ſuch Degrees of the Iſſue of the *Smell*.

Experiments in Conſort, touching the *Goodneſſe* and *Choice* of *Water*.

IT is a thing of very good Vſe, to diſcouer the *Goodneſſe* of *Waters*. The *Taſte*, to thoſe that Drinke *water* only, doth ſomewhat: But other *Experiments* are more ſure. Firſt, try *Waters* by *Weight*; Wherein you may find ſome difference, though not much: And the *Lighter* you may account the Better.

391 Secondly, try them by *Boyling* vpon an *Equall Fire*: And that which
392 conſumeth away faſteſt, you may account the Beſt.

393 Thirdly, try them in *Seuerall Bottles*, or Open Veſſells, Matches in euery Thing elſe, and ſee which of them *Laſt Longeſt*, without *Stench* or *Corruption*. And that which holdeth Vnputrified longeſt, you may likewiſe account the Beſt.

394 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the ſame *Quantity* of *Maulr*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nouriſhing; though perhaps it bee not ſo good for *Medicinall Vſe*. And ſuch *Water* (commonly) is the *Water* of *Large* and *Nauigable Riuers*; And likewiſe in *Large* and *Cleane Ponds* of *Standing-water*: For vpon both them, the Sunne hath more Power, than vpon Fountaines, or Small Riuers. And I conceiue that *Chalke-water* is next them the beſt, for going furtheſt in *Drinke*; For that alſo helpeth *Concoction*; So it bee out of a *Deepe Well*; For then it Cureth the Rawneſſe of the *Water*; But *Chalky water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloathes, which weare out apace, if you vſe ſuch *Waters*.

395 Fifthly, The Houſwiues doe finde a Difference in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*; And it is likely that the more *Fat water* will beare *Soape* beſt; For the *Hungry Water* doth kill the Vnctuous Nature of the *Soape*.

396 Sixthly, you may make a Iudgement of *Waters*, according to the *Place*, whence they Spring, or Come; The *Raine-Water* is, by the *Phyſitians*, eſteemed the Fineſt, and the beſt; But yet it is ſaid to putrifie ſooneſt; which is likely, becauſe of the Fineneſſe of the *Spirit*: And in *Conſeruatories*

ſeruatories of *Raine-Water*, (ſuch as they haue in *Venice*, &c.) they are found not ſo Choice *Waters*; The worſe, (perhaps,) becauſe they are Couered aloft, and kept from the Sunne. *Snow water* is held vnwholeſome; In ſo much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwiſe vpon the Aſcent (eſpecially the Women) by drinking of *Snow-water*, haue great Bags hanging vnder their Throats. *Well-water*, except it be vpon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the beſt; For both they ſeeme to haue a Lightneſſe, and Appetite of Mounting; And beſides they are moſt pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleys*, ioyne in effect vnder ground with all *Waters* of the ſame Leuell; Whereas *Springs*, on the *Tops* of *Hills*, paſſe thorow a great deale of Pure *Earth*, with leſſe Mixture of other *Waters*.

Seuenthly, Iudgement may bee made of *Waters*, by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleaneſt, and beſt taſted; And next to that *Clay Water*; And Thirdly, *Water* vpon *Chalke*; Fourthly, that vpon *Sand*; And Worſt of all vpon *Mud*. Neither may you truſt *Waters* that *Taſte Sweet*; For they are commonly found in Riſing Grounds of great *Cities*; which muſt needs take in a great deale of Filth. 397

IN *Peru*, and diuers Parts of the *weſt-Indies*, though vnder the *Line*, the *Heats* are not ſo Intolerable, as they bee in *Barbary*, and the Skirts of the *Torrid Zone*. The *Cauſes* are, Firſt the Great *Brizes*, which the Motion of the Aire in great Circles, (ſuch as are vnder the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in thoſe Parts Noone is nothing ſo hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cauſe* is, for that the Length of the Night, and the Dewes thereof, doe compenſe the *Heat* of the Day. A third *Cauſe* is the Stay of the Sunne; Not in Reſpect of Day and Night, (for that wee ſpake of before,) but in Reſpect of the *Seaſon*; For vnder the *Line*, the Sunne croſſeth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth and goeth backe againe, and ſo maketh one Long Summer. Experiment Solitary touching the *Temperate Heat* vnder the *Æquinoctiall*. 398

THE *Heat* of the *Sunne* maketh *Men Blacke* in ſome Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as wee ſee in *Gliſſemen*, that are continually about the *Fire*. The *Reaſon* may bee, becauſe *Fire* doth licke vp the *Spirits*, and Bloud of the Body, ſo as they Exhale; So that it euer maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud to the Outward *Parts*: And rather Concocteth it, than Soaketh it: And therefore wee ſee that all *Æthiopes* are Fleſhy, and Plumpe, and haue great Lips; All which betoken *Moiſture* retained, and not drawne out. Wee ſee alſo, that the Experiment Solitary touching the *Coloration* of *Blacke* and *Tawney Moores*. 399

Negroes are bred in Countries that haue Plenty of *Water*, by *Riuers* or otherwiſe: For *Meroë*, which was the *Metropolis* of *Æthiopia*, was vpon a great Lake: And *Congo*, where the *Negroes* are, is full of Riuers. And the Confines of the Riuer *Niger*, where the *Negroes* alſo are, are well watered: And the Region about *Cape Verde*, is likewiſe Moiſt, in ſo much as it is peſtilent through Moiſture: But the Countries of the *Abyſſenes*, and *Barbary*, and *Peru*, where they are Tawney, and Olinaſter, and Pale, are generally more Sandy and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleſhy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skin would ſuffer it to be ſeene.

Experiment Solitary touching *Motion* after the *Inſtant* of *Death*. 400

SOme *Creatures* doe moue a good while after their head is off; As *Birds*; Some a very little time; As *Men*, and all beaſts: Some moue, though cut in ſeuerall Peeces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. Firſt therefore it is certaine, that the *Immediate Cauſe* of *Death*, is the Reſolution, or Extinguiſhment of the *Spirits*; And that the Deſtruction or Corruption of the *Organs*, is but the *Mediate Cauſe*. But ſome *Organs* are ſo peremptorily neceſſary, that the Extinguiſhment of the Spirits doth ſpeedily follow; But yet ſo, as there is an *Interim* of a ſmall Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beaſt* hath lowed, after the Heart hath beene ſeuered; And it is a report alſo of Credit, that the *Head* of a *Pig* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or ſeuering it from the Marrow of the Backe-bone; During which time the *Pig* hath beene, in all appearance, ſtarke dead, and without Motion; And after a ſmall time, the Braine hath beene replaced, and the Skull of the *Pig* cloſed, and the *Pig* hath a little after gone about. And certaine it is, that an *Eye* vpon *Reuenge* hath beene thruſt forth, ſo as it hanged a pretty diſtance by the *Viſuall Nerue*; And during that time the *Eye* hath beene without any Power of *Sight*. And yet after (being replaced) recouered *Sight*. Now the *Spirits* are chiefly in the *Head* and *Cells* of the *Braine*, which in *Men*, and *Beaſts* are Large; And therefore when the *Head* is off, they moue little or Nothing. But *Birds* haue ſmall *Heads*, and therefore the *Spirits* are a little more diſperſed in the *Sinewes*, whereby Motion remaineth in them a little longer; In ſo much as it is Extant in Story, that an *Emperour* of *Rome*, to ſhew the Certainty of his Hand, did ſhoot a great Forked Arrow at an *Eſtrich*, as ſhe ranne ſwiftly vpon the Srage, and ſtrooke off her Head; And yet ſhe continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffuſed almoſt all ouer; And therefore they moue in their Seuerall Peeces.

NATVRALL HISTORIE.

V. Century.

WE will now enquire of *Plants* or *Vegetables*: And wee ſhall doe it with diligence. They are the Principall Part of the *Third Dayes Worke*. They are the firſt *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Eſſence*; And they are of excellent and generall Vſe, for Food, Medicine, and a Number of Mechanicall Arts.

Experiments in Conſort, touching the *Acceleration* of *Germination*.

There was ſowne in a *Bed*, *Turnip-Seed*, *Radiſh-Seed*, *Wheat*, *Cucumber-Seed*, and *Peaſe*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horſe-Dung*, old, and well rotted; This was laid vpon a Banke, halfe a foot high, and ſupported round about with Plankes; And vpon the Top was caſt Sifted Earth, ſome two Fingers deepe; And then the *Seed* ſprinkled vpon it, having beene ſteeped all night in *Water*, Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came vp halfe an Inch aboue Ground, within two dayes after, without any Watring. The Reſt the third day. The *Experiment* was made in *October*; And (it may bee) in the *Spring*, the *Accelerating* would haue beene the ſpeedier. This is a Noble *Experiment*; For without this helpe, they would haue

401

beene foure times as long in comming vp. But there doth not occur to me, at this preſent, any vſe thereof, for profit; Except it ſhould be for Sowing of *Peaſe*; which haue their Price very much increaſed, by the early Comming. It may bee tried alſo with *Cherries*, *Straw-beries*, and other Fruit, which are deareſt, when they come early.

402 There was *Wheat* ſteeped in *Water* mixed with *Cow-dung*; Other in *Water* mixed with *Horſe-dung*; Other in *Water* mixed with *Pigeon-dung*; Other in *Vrine* of *Man*; Other in *Water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Aſhes*; Other in *Water* mixed with *Bay Salt*; Other in *Claret Wine*; Other in *Malmſey*; Other in *Spirit* of *Wine*. The Proportion of the Mixture was a fourth Part of the Ingredients to the *Water*; Saue that there was not of the *Salt* aboue an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelue houres. The Time of the Yeere *October*. There was alſo other *Wheat* ſowne *vnſteeped*, but *watred* twice a day with *Warme Water*. There was alſo other *Wheat* ſowne *Simple* to compare it with the reſt. The Euent was; That thoſe that were in the Mixture of *Dung*, and *Vrine*, and *Soot*, *Chalke*, *Aſhes*, and *Salt*, came vp within ſix dayes: And thoſe that afterwards proued the Higheſt, Thickeſt, and moſt Luſty, were; Firſt, the *Vrine*; And then the *Dungs*; Next the *Chalke*, Next the *Soot*; Next the *Aſhes*; Next the *Salt*; Next the *Wheat Simple* of it ſelfe, vnſteeped, and vnwatred; Next the *Watred twice a* day with warme water; Next the *Claret wine*. So that theſe three laſt were ſlower than the ordinary *Wheat* of it ſelfe; And this Culture did rather retard, than aduance. As for thoſe that were ſteeped in *Malmſey*, and *Spirit* of *Wine*, they came not vp at all. This is a Rich *Experiment* for Profit: For the moſt of the Steepings are Cheape Things; And the Goodneſſe of the Crop is a great Matter of Gaine; If the Goodneſſe of the Crop anſwer the Earlineſſe of the Comming vp: As it is like it will; Both being from the vigour of the *Seed*; Which alſo partly appeared in the Former *Experiments*, as hath beene ſaid. This *Experiment* would bee tried in other *Graines*, *Seeds*, and *Kernels*: For it may bee ſome *Steeping* will agree beſt with ſome *Seeds*. It would bee tried alſo with *Roots* ſteeped as before, but for *Longer Time*. It would bee tried alſo in *Seuerall Seaſons* of the *Yeere*, eſpecially the *Spring*.

403 *Straw-berries* watred now and then (as once in three dayes) with *Water*, wherein hath beene ſteeped *Sheeps dung*, or *Pigeons-dung*, will preuent and come early. And it is like, the ſame Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an *Experiment*, though vulgar in *Straw-berries*, yet not brought into vſe generally: For it is vſuall to helpe the Ground with Mucke; And likewiſe to Recomfort it ſometimes with Mucke put to the Roots; But to water it with *Mucke water*, which is like to bee more Forcible, is not practiſed.

404 *Dung*, or *Chalke*, or *Blood*, applied in Subſtance, (ſeaſonably) to the Roots

Roots of Trees, doth ſet them forwards. But to doe it vnto *Herbs*, without Mixture of *Water* or *Earth*, it may bee theſe Helpes are too Hot.

405 The former *Meanes* of Helping *Germination*, are either by the *Goodneſſe* and *Strength* of the *Nouriſhment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the Nouriſhment better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are alſo the Experiments that follow; Though they bee not Applications to the *Root*, or *Seed*. The *Planting* of *Trees warme* vpon a *wall*, againſt the South, or South-Eaſt Sunne, doth haſten their Comming on, and Ripening; And the South-Eaſt is found to bee better than the South-Weſt, though the South-Weſt bee the Hotter Coaſt. But the cauſe is chiefly, for that the Heat of the Morning ſucceedeth the Cold of the Night: and partly, becauſe (many times) the South-Weſt Sunne is too Parching. So likewiſe the *Planting* of them vpon the *Backe* of a *Chimney*, where a *Fire* is kept, doth haſten their Comming on, and Ripening: Nay more, the *Drawing* of the *Roughes* into the *Inſide* of a *Roome*, where a Fire is continually kept, worketh the ſame Effect: Which hath been tried with Grapes; In ſo much as they will come a Moneth earlier, than the Grapes abroad.

406 Beſides the two *Meanes* of *Accelerating Germination*, formerly deſcribed; That is to ſay, the *Mending* of the *Nouriſhment*; and *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Eaſie Comming* to the *Nouriſhment*, and *Drawing* it. And therefore *Gentle Digging* and *Looſening* of the *Earth* about the *Roots* of *Trees*; And the *Remouing Herbs* and *Flowers* into new Earth, once in two yeares, (which is the ſame thing; For the new Earth is euer looſer) doth greatly further the *Proſpering*, and *Earlineſſe* of *Plants*.

407 But the moſt admirable *Acceleration* by *Facilitating* the *Nouriſhment*, is that of *Water*. For a *Standard* of a *Damaske* Roſe with the *Root* on, was ſet in a Chamber, where no Fire was, vpright in an *Earthen Panne*, full of *Faire water*, without any Mixture, halfe a foot vnder the *Water*, the *Standard* being more than two foot high aboue the *water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene Leafe, and ſome other little Buds, which ſtood at a ſtay, without any Shew of decay or withering, more than ſeuen Dayes. But afterwards that Leafe faded, but the young Buds did ſprout on; which afterward opened into faire Leaues, in the ſpace of three Moneths; And continued ſo a while after, till vpon Remouall wee left the Triall. But note that the *Leaues* were ſomewhat paler, and lighter coloured, than the *Leaues* vſe to bee abroad. Note that the firſt *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would haue put forth with greater ſtrength, and (it may bee) to haue growne on to beare Flowers. By this Meanes, you may haue (as it ſeemeth) *Roſes* ſet in the middeſt of a *Poole*, being ſupported with ſome ſtay; Which is Matter of Rareneſſe and Pleaſure, though of ſmall Vſe. This is the more

ſtrange, for that the like *Roſe-ſtandard* was put, at the ſame time, into *Water* mixed with *Horſe-dung*, the Horſe-dung about the fourth Part to the *Water*, and in foure Moneths ſpace (while it was obſerued) put not forth any *Leaſe*, though diuers *Buds* at the firſt, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewiſe put at the ſame time, all vnder *Water*, ſome two or three Fingers deepe; And within ſeuen dayes ſprouted, and continued long after, further Growing. There were alſo put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddiſh Root*, which had all their *Leaues* cut almoſt cloſe to the *Roots*; And within ſix weekes had faire *Leaues*; And ſo continued till the end of *November*.

409 Note, that if *Roots*, or *Peaſe*, or *Flowers*, may bee *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that thoſe Things beare when they come early: The other in the *Swiftneſſe* of their *Returnes*: For in ſome Grounds which are ſtrong, you ſhall haue a *Raddiſh*, &c. come in a Moneth; That in other Grounds wil not come in two; And ſo make double *Returnes*.

410 *Wheat* alſo was put into the *water*, and came not forth at all; So as it ſeemeth there muſt bee ſome Strength and Bulke in the Body, put into the *Water*, as it is in *Roots*; For *Graines* or *Seeds*, the Cold of the *Water* will mortifie. But caſually ſome *Wheat* lay vnder the Pan, which was ſomewhat moiſtened by the Suing of the Pan; which in ſix weekes (as aforeſaid) looked mouldy to the Eye, but it was ſprouted forth halfe a fingers length.

411 It ſeemeth by theſe *Inſtances* of *water*, that for Nouriſhment, the *Water* is almoſt all in all, and that the *Earth* doth but keepe the *Plant* vpright, and ſaue it from Ouer-heat, and Ouer-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proueth alſo that our former *Opinion*; That Drinke incorporate with Fleſh, or Roots, (as in *Capon-Beere*, &c.) will nouriſh more eaſily, than Meat and Drinke taken ſeuerally.

412 The *Houſing* of *Plants* (I conceiue) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seaſons*: And as wee *Houſe Hot-Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to ſaue them; So wee may *Houſe* our owne *Countrey Plants*, to forward them, and make them come in the Cold Seaſons; In ſuch ſort, that you may haue *Violets*, *Straw-berries*, *Peaſe*, all Winter: So that you ſow, or remoue them at fit times. This *Experiment* is to bee referred vnto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Houſing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Conſort, touching the *Putting backe* or *Retardation* of *Germination*.

413 TO make *Roſes*, or other *Flowers* come late, it is an *Experiment* of Pleaſure. For the Ancients eſteemed much of *Roſa Sera*. And indeed the *Nouember-Roſe* is the ſweeteſt, hauing beene leſſe exhaled by the Sunne. The Meanes are theſe. Firſt, the *Cutting off their Tops*, immediately after they haue done Bearing; And then they will come againe

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the ſame yeare about *Nouember*: But they will not come iuſt on the Tops, where they were cut, but out of thoſe Shoots, which were (as it were,) *Water-Boughes*. The *Cauſe* is, for that the Sap, which otherwiſe would haue fed the Top, though after Bearing,) will, by the diſcharge of that, diuert vnto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Roſe*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cauſe* is the ſame with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the ſame Effect, in Retention of the Sap for a time, and Diuerſion of it to the Sprouts, that were not ſo forward. 414

The Third is the *Cutting* off ſome few of the *Top-boughes* in the *Spring-time*, but ſuffering the lower Boughes to grow on. The *Cauſe* is, for that the Boughes doe helpe to draw vp the Sap more ſtrongly; And wee ſee that in Powling of Trees, many doe vſe to leaue a Bough or two on the Top, to helpe to draw vp the Sap. And it is reported alſo, that if you graft vpon the Bough of a Tree, and cut off ſome of the old Boughes, the new Cions will periſh. 415

The Fourth is by *Laying the Roots bare about Chriſtmas*, ſome dayes. The *Cauſe* is plaine, for that it doth arreſt the Sappe, from going vpwards, for a time; Which Arreſt is afterwards releaſed by the Couering of the Root againe with Earth; And then the Sap getteth vp, but later. 416

The Fifth is the *Remouing* of the *Tree*, ſome Moneth before it *Buddeth*. The *Cauſe* is, for that ſome time will bee required after the *Remoue*, for the Reſetling, before it can draw the Iuyce: And that time being loſt, the Bloſſome muſt needs come forth later. 417

The Sixth is the *Grafting* of *Roſes* in *May*, which commonly Gardiners doe not till *Iuly*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the ſame yeare, but late. 418

She Seuenth is, the *Girding* of the *Body* of the *Tree* about with ſome Packe-threed; For that alſo, in a degree, reſtraineth the Sap, and maketh it come vp, more late, and more Slowly. 419

The Eighth is, the *Planting* of them in a *Shade*, or in a *Hedge*. The *Cauſe* is, partly the Keeping out of the Sunne, which haſteneth the Sap to riſe; And partly the Robbing of them of Nouriſhment, by the Stuffe in the *Hedge*. Theſe Meanes may bee practiſed vpon other, both Trees, and Flowers, *Mutatis Mutandis*. 420

Men haue entertained a Conceit that ſheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, vpon a Stocke of a *Fruit-tree*, that *Commeth early*, the Graft will beare *Fruit early*; As a Peach upon a Cherry; And contrariwiſe, if an *Early-Comming-Fruit* vpon a Stocke of a *Fruit-tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry vpon a Peach. But theſe are but Imaginations, and vntrue. The *Cauſe* is, for that the Cions ouer-ruleth the Stocke quite; And the Stocke is but Paſſiue onely, and giueth Aliment, but no Motion to the Graft. 421

Experiments in Conſort, touching the *Melioration* of *Fruits, Trees*, and *Plants*.

We will ſpeake now, how to make *Fruits, Flowers*, and *Roots* larger; in more plenty; and ſweeter; than they vſe to bee; And how to make the *Trees* themſelues, more Tall; more Spread; and more Haſtie and Sudden; than they vſe to be. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will ſerue much to theſe purpoſes. And againe, that theſe *Experiments*, which wee ſhall now ſet downe, doe ſerue alſo for *Acceleration*; becauſe both Effects proceed from the Encreaſe of Vigour in the Tree: But yet to auoid Confuſion; And becauſe ſome of the Meanes are more proper for the one Effect, and ſome for the other, wee will handle them apart.

422 It is an aſſured Experience, that an *Heap* of *Flint*, or *Stone*, laid about the *Bottome* of a *wilde-Tree*, (as an Oake, Elme, Aſh, &c.) vpon the firſt Planting, doth make it proſper double as much, as without it. The *Cauſe* is, for that it retaineth the Moiſture, which falleth at any time vpon the *Tree*, and ſuffereth it not to bee exhaled by the Sunne. Againe, it keepeth the Tree warme, from Cold Blaſts and Froſts, as it were in an Houſe. It may be alſo, there is ſomewhat in the Keeping of it ſteady at the firſt. *Quare*, if Laying of Straw ſome Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giueth the Sap, yet it is the Body that draweth it. But you muſt note, that if you lay *Stones* about the ſtalke of Lettuce, or other Plants, that are more ſoft, it will ouer-moiſten the Roots, ſo as the Wormes will eat them.

423 A *Tree*, at the firſt *Setting*, ſhould not bee *Shaken*, vntill it hath *taken Root fully*: And therefore ſome haue put two little Forkes about the Bottome of their *Trees*, to keepe them vpright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Looſening of the Earth, and (perhaps) by Exerciſing (as it were) and Stirring the Sap of the *Tree*.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwiſe, the *Powling* and *Cutting* of the Top, maketh them grow ſpread, and Buſhy. As we ſee in *Pollards*, &c.

425 It is reported, that to make *haſty Growing Coppice-Woods*, the way is, to take *Willow, Sallow, Poplar, Alder*, of ſome ſeuen yeares growth; And to ſet them, not vpright, but a-ſlope, a reaſonable depth vnder the Ground; And then, in ſtead of one Root, they will put forth many, and ſo carry more Shoots vpon a Stemme.

426 When you would haue *many new Roots* of *Fruit-Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat vpon the Ground, and caſt Earth vpon them; And euery Twigge will take Root. And this is a very profitable *Experiment* for Coſtly *Trees*; (for the Boughes will make

Stockes

Stockes without charge.) Such as are *Apricots*, *Peaches*, *Almonds*, *Cornelians*, *Mulberies*, *Figs*, &c. The like is continually practiled with *Vines*, *Roses*, *Muske-Roses*, &c.

From *May* to *July* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches; and couer the bare Place, somewhat aboue, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the Bough about *Alborisontride* in the bare place, and set it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cause* may be, for that the *Barke* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the Bough; And it may be also that the Loame and Horse-Dung applied to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping vp the Sap of *Trees* in their Boughes, Which may serue to other Effects. 427

It hath beene practised in *Trees*, that shew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppressed with his owne Sap, for *Repletion* is an Enemie to Generation. 428

It hath beene practised in *Trees*, that doe not beare, to cleaue two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The *Cause* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no lesse than the Body of the Tree; But it will not keepe open without somewhat put into it. 429

It is vsually practised, to set *Trees* that require much *Sunne*, vpon *Walls* against the *South*; As *Apricots*, *Peaches*, *Plums*, *Vines*, *Figs*, and the like. It hath a double Commodity; The one, the *Heat* of the *Wall* by *Reflection*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the vpper Boughes ouer-shadow the lower; But when it is spread vpon a Wall, the Sunne commeth alike, vpon the vpper, and lower Branches. 430

It hath also beene practised (by some) to pull off some *Leaues* from the *Trees* so *spread*, that the Sunne may come vpon the *Bough* and *Fruit* the better. There hath beene practised also a Curiosity, to set a *Tree* vpon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and spread him vpon the *South-Side*: Conceiuing that the Root and lower Part of the Stocke should enioy the freshnesse of the Shade; And the Vpper Boughes, and Fruit, the Comfort of the Sunne. But it sorted not; The *Cause* is, for that the *Root* requireth some Comfort from the Sunne, though vnder Earth, as well as the *Body*: And the Lower Part of the Body more than the Vpper, as wee see in Compassing a *Tree* below with Straw, 431

The *Lownesse* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall euer see in *Apricots*, 432

Peaches,

Peaches, or *Melo-Cotones*, vpon a wall, the greater Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow vpon low Vines, bound to ſmall Stakes. And the raiſed Vines in Arbours make but Veriuyce. It is true, that in *Italy*, and other *Countries*, where they haue hotter Sunne, they raiſe them vpon *Elmes*, and Trees; But I conceiue, that if the *French* Manner of Planting low, were brought in vſe there, their *wines* would be ſtronger and ſweeter. But it is more chargeable in reſpect of the Props. It were good to trie whether a *Tree* grafted ſomewhat neare the Ground, and the lower boughes only maintained, and the higher continually proined off, would not make a larger *Fruit*.

433 To haue *Fruit* in *Greater Plenty*, the way is, to graft, not onely vpon young *Stocks*, but vpon diuers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but vpon one Stocke, the *Tree* can beare but few.

434 The *Digging* yearely about the *Roots* of *Trees*, which is a great means, both to the *Acceleration* and *Melioration* of *Fruits*, is practiſed in nothing but in *Vines*; Which if it were transferred vnto other *Trees*, and *Shrubs*, (as *Roſes*, &c.) I conceiue would aduance them likewiſe.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blowne vp (almoſt) by the Roots, and ſet vp againe, and the next yeare bare exceedingly. The *Cauſe* of this, was nothing but the *Looſening* of the *Earth*, which comforteth any *Tree*, and is fit to be practiſed, more than it is, in *Fruit-Trees*: For *Trees* cannot be ſo fitly remoued into New Grounds, as *Flowers* and *Herbs* may.

436 To reuiue an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the Roots, is the way. We ſee alſo that *Draught-Oxen*, put into freſh Paſture, gather new and tender Fleſh: And in all Things, better nouriſhment than hath beene vſed, doth helpe to renew; Eſpecially, if it be not onely better, but changed, and differing from the former.

437 If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reaſon is, for that the Moiſture being forbidden to come vp in the Plant, ſtayeth longer in the Root, and ſo dilateth it. And *Gardiners* vſe to tread downe any looſe Ground, after they haue ſowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottome of a *Root*, it will cauſe the Root to grow to an Exceſſiue Bigneſſe. The *Cauſe* is, for that being it ſelfe of a Spungy Subſtance, it draweth the Moiſture of the Earth to it, and ſo feedeth the Root. This is of greateſt vſe for *Onions*, *Turnips*, *Parſnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things do proſper beſt, when they are aduanced to the better: Your *Nurſery* of *Stocks* ought to be in a more

Barren

Barren Ground, than the Ground is whereunto you remoue them. So all *Graziers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it leaueth a Cherishing to the better of the Bodie, in Age: Nay in Exercises, it is good to beginne with the hardest, as Dancing in Thicke Shooes, &c.

It hath beene obserued, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acrosse, so as you make them rather in slices, than in continued Hackes, doth great good to *Trees*; And especially deliuereth them from being *Hide-bound*, and killeth their Mosse. 440

Shade to some *Plants* conduceth to make them large, and prosperous, more than *Sunne*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borrage-Seed*; And you shall finde the *Strawberries* vnder those Leaues farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *weed* giueth them *Shade*. 441

To increase the *Crops* of *Plants*, there would be considered, not only the *Increasing* this *Lust* of the *Earth*, or of the *Plant*, but the sauing also of that which is spent. So they haue lately made a Triall, to *Set wheat*, which neuertheless hath beene left off, because of the trouble and paines; Yet so much is true, that there is much saued by the *Setting*, in comparison of that which is *Sowen*; Both by keeping it from being picked vp by Birds; And by Auoiding the Shallow lying of it, whereby much that is sowen taketh no Root. 442

It is prescribed by some of the *Ancients*, that you take *Small Trees*, vpon which *Figs* or other *Fruit* grow, being yet vnripe, and couer the *Trees* in the Middle of *Autumne* with dung, vntill the Spring; And then take them vp in a warme day, and replant them in good ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the same kind, doe but blossome. But this seemeth to haue no great Probability. 443

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thicknesse of *Honey*, and therewith annoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*. 444

Take *Seed*, or *Kernels* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come vp much earlier than in the *Earth* it selfe. This I conceiue to bee as a Kinde of *Grafting* in the *Root*; For as the Stocke of a Graft yeeldeth better prepared nourishment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*. And I suppose the same would be done, by Putting *Kernells* into a *Turnip*, or 445

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the like; Saue that the *Squill* is more Vigorous and Hot. It may be tried alſo, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in ſeuerall places, when it is almoſt at his Bigneſſe, and before it ripeneth, hath beene practiſed with ſucceſſe, to ripen the Fruit more ſuddenly. Wee ſee the Example of the *Biting* of *Waſpes*, or *Wormes*, vpon *Fruit*, whereby it (manifeſtly) ripeneth the ſooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put vnder the *Roots of Cole worts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertility.

448 It hath beene practiſed, to cut off the Stalkes of *Cucumbers*, immediatly after their *Bearing*, cloſe by the Earth; And then to caſt a prettie Quantity of Earth vpon the *Plant* that remaineth; and they will beare the next yeare Fruit, long before the ordinary time. The *Cauſe* may be, for that the Sap goeth downe the ſooner, and is not ſpent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the Winter, of the *Roots* of *Plants*, that are *Annuall*, ſeemeth to bee partly cauſed by the Over-Expence of the Sap into Stalke and Leaues; which being preuented, they will ſuper-annate, if they ſtand warme.

449 The *Pulling off* many of the *Bloſſomes* from *a Fruit-Tree*, doth make the *Fruit* fairer. The *Cauſe* is manifeſt; For that the Sap hath the leſſe to nouriſh. And it is a Common Experience, that if you doe not pull off ſome *Bloſſomes*, the firſt time a *Tree* bloometh, it will bloſſome it ſelfe to death.

450 It were good to try, what would be the Effect, if all the *Bloſſomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Cheſnut-buds*, &c. from a *wilde Tree*, for two yeares together. I ſuppoſe that the *Tree* will either put forth the third yeare, bigger, and more plentifull *Fruit*; Or elſe the ſame yeares, larger Leaues, becauſe of the Sap ſtored vp.

451 It hath beene generally receiued, that a *Plant watered* with *warme water*, will come vp ſooner and better, than with Cold Water, or with Showres. But our *Experiment* of *watering wheat* with *warme water* (as hath beene ſaid) ſucceeded not; which may be, becauſe the Tryall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming vpon the *Seed*, after it was made more tender by the Warme Water, might checke it.

452 There is no doubt, but that *Grafting* (for the moſt Part) doth *meliorate* the *Fruit*. The *Cauſe* is manifeſt; For that the Nouriſhment is better prepared in the *Stocke*, than in the *Crude Earth*. But yet note well, that there be ſome *Trees*, that are ſaid to come vp more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cauſe* I ſuppoſe to be, for that thoſe *Plants* require a Nouriſhment of great Moiſture; And though the Nouriſhment of the *Stocke* be ſuper,

and

and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed we see those *Fruits* are very cold *Fruits* in their Nature.

453 It hath beene receiued, that a Smaller *Peare*, grafted vpon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* vpon the *Late Stocke*; And *è conuerso*; which wee reiected before: For the *Cions* will gouerne. Neuertheless it is probable enough, that if you can get a *Cions* to grow vpon a *Stocke* of another kinde, that is much moister than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull Nourishment; Though it is like it will make the *Fruit* Baser. But generally, the *Grafting* is vpon a dryer *Stocke*; As the *Apple* vpon a *Crab*; The *Peare* vpon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* vpon the *Stocke* of a *Cole-wort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be set, will be a *Cole-wort*, and not an *Apple*. It were good to try, whether an *Apple-Cions* will prosper, if it be grafted vpon a *Sallow*, or vpon a *Poplar*, or vpon an *Alder*, or vpon an *Elme*, or vpon an *Horse-Plumme*, which are the moistest of *Trees*. I haue heard that it hath beene tried vpon an *Elme*, and succeeded.

454 It is manifest by Experience, that *Flowers* Remoued wax greater, because the Nourishment is more easily come by, in the loose Earth. It may bee, that Oft Regrafting of the same Cions, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it vpon a *Stocke* the first yeare; And then cut it off, and graft it vpon another *Stocke* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting *there are many* Experiments *worth the Noting, but those wee reserue to a proper Place.*

455 It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaues, haue his Top cut off. The cause is plaine, for that the Sap hath the lesse to feed, and the lesse way to mount: But it may bee, the *Fig* will come somewhat later, as was formerly touched. The same may bee tried likewise in other *Trees*.

456 It is reported, that *Mulberries* will bee fairer, and the *Trees* more fruitfull, if you bore the *Trunk* of the *Tree* thorow, in seuerall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiacum*, *Iuniper*, &c. The *Cause* may be, for that Aduentiue Heat doth cheare vp the Natiue Iuyce of the *Tree*.

457 It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Blood* to the *Root*: The *Cause* may bee the Encreasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinary *Composts*.

458 It is reported by one of the Ancients, that *Artichoakes* will bee lesse prickly, and more tender, if the *Seeds* haue their Tops dulled, or grated off vpon a Stone.

459 *Herbs* will bee tenderer, and fairer; if you take them out of *Beds*, when they are newly come vp, and remoue them into *Pots*, with better *Earth*. The Remoue from *Bed* to *Bed* was ſpoken of before; But that was in ſeuerall yeares; This is vpon the ſudden. The *Cauſe* is the ſame with other *Remoues*, formerly mentioned.

460 *Cole-worts* are reported by one of the *Ancients*, to proſper exceedingly, and to be better taſted, if they be ſometimes watred with *Salt water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is leſſe Adurent than *Salt*.

461 It is reported that *Cucumbers* will proue more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cauſe* may bee, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the groſſer Iuyce of the Earth, but onely the finer. The ſame *Experiment* may bee made in *Artichoakes*, and other *Seeds*, when you would take away, either their Flaſhineſſe, or Bitterneſſe. They ſpeake alſo, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that ſeemeth to me not ſo probable, becauſe *Honey* hath too quicke a Spirit.

462 It is reported that *Cucumbers* will bee leſſe *Watry*, and more *Melon-like*, if in the Pit where you ſet them, you fill it (halfe way vp) with *Chaffe*, or ſmall *Stickes*, and then powre *Earth* vpon them; For *Cucumbers*, as it ſeemeth, doe extremely affect Moiſture; And ouer-drinke themſelues; which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you ſet a Pot of water about fiue or ſix inches diſtance from it, it will, in 24. houres, ſhoot ſo much out, as to touch the Pot; Which if it bee true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it diſcouereth *Perception* in *Plants*, to moue towards that which ſhould helpe and comfort them, though it bee at a diſtance. The ancient Tradition of the *Vine* is far more ſtrange: It is, that if you ſet a Stake, or Prop, ſome diſtance from it, it will grow that way; Which is farre ſtranger (as is ſaid) than the other; For that *Water* may worke by a *Sympathy* of *Attraction*: But this of the *Stake* ſeemeth to bee a Reaſonable Diſcourſe.

463 It hath beene touched before, that *Terebration* of *Trees* doth make them proſper better. But it is found alſo, that it maketh the *Fruit* ſweeter, and better. The *Cauſe* is, for that notwithſtanding the *Terebration*, they may receiue Aliment ſufficient; And yet no more than they can well turne, and diſgeſt; And withall doe ſweat out the courſeſt and vnprofitableſt Iuyce; Euen as it is in *Liuing Creatures*, which by Moderate Feeding, and Exerciſe, and Sweat, attaine the ſoundeſt Habit of Body.

464 As *Terebration* doth *Meliorate Fruit*, ſo, vpon the like reaſon, doth *Letting* of *Plants Blood*; As *Pricking Vines*, or other *Trees*, after they bee of ſome Growth; And thereby letting forth *Gum*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at ſome Seaſons. And it is reported, that by this Artifice, *Bitter Almonds* haue beene turned into *Sweet*.

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465 The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-dung*, aboue all other *Dung*; Which may be, becauſe of the Moiſture of that Beaſt, whereby the *Excrement* hath leſſe Acrimony; For we ſee *Swines* and *Pigs* Fleſh is the Mouſteſt of Fleſhes.

466 It is obſerued by ſome, that all *Herbs* wax ſweeter, both in Smell, and Taſte, if after they be growne vp ſome reaſonable time, they bee cut, and ſo you take the later Sprout. The *Cauſe* may bee, for that the longer the Iuyce ſtayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Cauſes, why *Graines*, *Seeds*, and *Fruits*, are more Nouriſhing than *Leaues*, is the Length of time, in which they grow to *Maturation*. It were not amiſſe to keepe backe the Sap of *Herbs*, or the like, by ſome fit meanes, till the end of Summer; whereby (it may be) they will be more Nouriſhing.

467 As *Graſting* doth Generally aduance and *Meliorate Fruits*, aboue that which they would bee, if they were ſet of *Kernels*, or *Stones*, in regard the *Nouriſhment* is better concocted; ſo (no doubt) euen in *Graſting*, for the ſame Cauſe the Choice of the *Stocke* doth much; Alwayes prouided, that it bee ſomewhat inferiour to the *Cions*: For otherwiſe it dulleth it. They commend much the *Graſting* of *Peares*, or *Apples*, vpon a *Quince*.

468 Beſides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is ſet downe as tried, that a *Mixture* of *Bran*, and *Swines-dung*; Or *Chaffe* and *Swines-dung*; (eſpecially laid vp together for a Moneth to rot,) is a very great Nourither, and Comforter to a *Fruit-Tree*.

469 It is deliuered, that *Onions* wax greater, if they bee taken out of the Earth, and laid a drying twenty daies, and then ſet againe; And yet more, if the outermoſt Pill be taken off all ouer.

470 It is deliuered by ſome, that if one take the *Bough* of a *Low Fruit-Tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the Bottome to let in the *Plant*, and then Couer the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Remouing, and Leauing the *Fruit* in the Earth. The like, (they ſay,) will be effected, by an Empty *Pot*, without Earth in it, put ouer a *Fruit*, being propped vp with a *Stake*, as it hangeth vpon the *Tree*; And the better, if ſome few Pertuſions bee made in the *Pot*. Wherein, beſides the Defending of the *Fruit*, from Extremity of Sunne or Weather, ſome giue a reaſon, that the *Fruit*, Louing and Coueting the open Aire and Sunne, is inuited by thoſe Pertuſions, to ſpread and approach, as neere the open Aire, as it can; And ſo enlargeth in *Magnitude*.

471 All *Trees* in *High* and *Sandy Grounds*, are to bee ſet deepe; And in *Watry Grounds*, more ſhallow. And in all *Trees*, when they be remoued (eſpecially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* bee coaſted, (*North*, and *South*, &c.) as they ſtood before. The ſame is ſaid alſo of *Stone* out of the *Quarry*, to make it more durable; Though that

ſeemeth to haue leſſe reaſon; Becauſe the *Stone* lyeth not ſo neere the Sun, as the *Tree* groweth.

472 *Timber Trees* in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both becauſe, they offer not to ſpread ſo much, but ſhoot vp ſtill in Height; And chiefly becauſe they are defended from too much Sunne and Wind, which doe checke the Growth of all *Fruit*; And ſo (no doubt) *Fruit-Trees*, or *Vines*, ſet vpon a *Wall*, againſt the Sunne, betweene Elbowes or Buttreſſes of Stone, ripen more, than vpon a Plaine Wall.

473 It is ſaid, that if *Potado Roots*, be ſet in a *Pot* filled with Earth, and then the *Pot* with Earth bee ſet likewiſe within the Ground, ſome two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cauſe* may bee, for that hauing Earth enough within the *Pot* to nouriſh them; And then being ſtopped by the Bottome of the *Pot* from putting Strings downward, they muſt needs grow greater in Breadth and Thickneſſe. And it may be, that all *Seeds*, or *Roots*, *Potted*, and ſo ſet into the *Earth*, will proſper the better.

474 The *Cutting off* the *Leaues* of *Radiſh*, or other *Roots*, in the beginning of Winter, before they wither; And couering againe the *Root*, ſomething high with Earth; Will preſerue the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Vſe of this *Cutting off* the *Leaues*: For in *Plants*, where the *Root* is the *Eſculent*, as *Radiſh*, and *Parſnips*, it will make the *Root* the greater: And ſo it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Eſculent*, by Strengthening the *Root*, it will make the *Fruit* alſo the greater.

475 It is an *Experiment* of great pleaſure, to make the *Leaues* of *Shady Trees*, larger than ordinary. It hath beene tried (for certaine) that a *Cions* of a *Weech-Elme*, grafted vpon the Stocke of an Ordinary *Elme*, will put forth Leaues, almoſt as broad as the Brim of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaues*. It would be tried therefore in *Trees* of that kind chiefly; As *Birch*, *Aſpe*, *Willow*; And eſpecially the *Shining Willow*, which they call *Swallow-taile*, becauſe of the pleaſure of the Leaſe.

476 The *Barrenneſſe* of *Trees*, by *Accident*, (beſides the *Weakneſſe* of the *Soile*, *Seed*, or Root; And the *Iniury* of the *Weather*) commeth either of their *Ouer-growing* with *Moſſe*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Iſſuing* of the *Sap too much into the Leaues*. For all theſe there are *Remedies* mentioned before.

Experiments in Conſort, touching *Compound Fruits* and *Flowers*.

Wee ſee that in *Liuing Creatures*, that haue *Male* and *Female*, there is Copulation of ſeuerall Kindes; And ſo *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horſe* and the *Aſſe*; And ſome other *Compounds*, which wee call *Monſters*,

sters, though more rare: And it is held, that that *Prouerbe*, *Africa semper aliquid Monstri parit*; commeth, for that the Fountaines of Waters there, being rare, diuers sorts of Beasts come from seuerall Parts to drinke; And so being refreshed, fall to couple, and many times with seuerall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; Which neuertheless, if it be possible, is more at command, than that of *liuing Creatures*; For that their Lust requireth a voluntary Motion: wherefore it were One of the most Noble *Experimens* touching *Plants*, to finde it out: For so you may haue great Varicty of New *Fruits*, and *Flowers* yet vnknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* euer ouer-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of seuerall *Fruit Tres*, and flat them on the sides, and then binde them close together, and set them in the ground, they will come vp in one Stocke; But yet they will put forth their seuerall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnity* of *Continuance*, is easier to procure, than *Vnity* of *Species*. It is reported also, that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the vpper Parts being flatted, and bound close together, will put forth *Grapes* of the seuerall Colours vpon the same Branch; And *Grapestones* of seuerall Colours within the same *Grape*: But the more, after a yeere or two; The Vnity (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Vniting*, they be often Watred; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time. 477

They report, that diuers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put vp *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth. 478

It is reported, that young *Trees*, of seuerall kinds, set contiguous, without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxury of the *Trees*, will incorporate, and grow together. Which seemeth to me the likelieft Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better *vnite*. 479

Experiments in Consort touching the *Sympathy* and *Antipathy* of *Plants*.

There are many Ancient and Receiued Traditions, and Obseruations, touching the *Sympathy* and *Antipathy* of *Plants*:

For that ſome will thriue beſt growing neere others; which they impute to *Sympathy*: And ſome worſe; which they impute to *Antipathy*. But theſe are Idle and Ignorant Conceits; And forſake the true *Indication* of the *Cauſes*; As the moſt Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any ſuch Secret *Friendſhip*, or *Hatred*, as they imagine; And if wee ſhould bee content to call it *Sympathy*, and *Antipathy*, it is vtterly miſtaken; for their *Sympathy*, is an *Antipathy*, and their *Antipathy* is a *Sympathie*: For it is thus; Whereſoeuer one *Plant* draweth ſuch a particular Iuyce out of the Earth; as it qualifieth the Earth; So as that Iuyce which remaineth is fit for the other Plant, there the Neighbourhood doth good; Becauſe the Nouriſhments are contrary, or ſeuerall: But where two *Plants* draw (much) the ſame Iuyce, there the Neighbourhood hurteth; For the one deceiueth the other.

480 Firſt therefore, all *Plants* that doe draw much *Nouriſhment* from the *Earth*, and ſo ſoake the *Earth*, and exhauſt it, hurt all Things that grow by them; As great *Trees*, (eſpecially *Aſhes*) and ſuch *Trees*, as ſpread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently receiued) to the *Vine* onely; But it is an Enemy to any other *Plant*; Becauſe it draweth ſtrongly the fatteſt Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away; This may be, becauſe there it findeth worſe Nouriſhment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nouriſheth.

481 Where *Plants* are of ſeuerall Natures, and draw ſeuerall Iuyces out of the Earth, there (as hath beene ſaid) the One ſet by the other helpeth: As it is ſet downe by diuers of the Ancients, that *Rew* doth proſper much, and becommeth ſtronger, if it be ſet by a *Figge-Tree*: which (we conceiue) is cauſed, Not by Reaſon of *Friendſhip*; but by *Extraction* of a Contrary Iuyce: The one Drawing *Iuyce* fit to reſult Sweet, the other bitter. So they haue ſet downe likewiſe, that a *Roſe* ſet by *Garlick* is ſweeter: Which likewiſe may be, becauſe the more Fetide Iuyce of the Earth goeth into the *Garlicke*; and the more Odorate into the *Roſe*.

482 This wee ſee manifeſtly, that there be certaine *Corne-Flowers*, which come ſeldome or neuer in other places, vnleſſe they bee ſet; But onely amongſt Corne: As the *Blew-bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitory*. Neither can this bee, by Reaſon of the Culture of the Ground, by Plowing, or Furrowing; As ſome *Herbs*, and *Flowers*, will grow but in *Ditches* new Caſt; For if the *Ground* lie fallow, and vnſowne, they will not come: So as it ſhould ſeeme to bee the *Corne*, that

that qualifieth the Earth, and prepareth it for their Growth.

This Obſeruation, if it holdeth, (as it is very probable,) is of great vſe for the *Meliorating* of *Taſte* in *Fruits*, and *Eſculent Herbes*; And of the *Scent* of *Flowers*. For I doe not doubt, but if the *Figge Tree* doe make the *Rew* more ſtrong, and bitter, (as the Ancients haue noted,) good ſtore of *Rew* planted about the *Fig-Tree*, will make the *Fig* more ſweet. Now the *Taſtes* that doe moſt offend in *Fruits*, and *Herbes*, and *Roots*, are *Bitter*; *Harriſh*; *Sowre*; And *watriſh*, or *Flaſhy*. It were good therefore to make the *Trialls* following. 483

Take *Wormewood*, or *Rew*, and ſet it neere *Lettuce*, or *Coleflory*, or *Artichoake*; And ſee whether the *Lettuce*, or the *Coleflory*, &c. become not the ſweeter. 484

Take a *Seruice-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which wee know haue *Fruits* of harſh and binding Iuyce, and ſet them neare a *Vine*, or *Figge-Tree*, and ſee whether the *Grapes*, or *Figges*, will not be the ſweeter. 485

Take *Cucumbers*, or *Pumpions*, and ſet them (here and there) amongſt *Muske-Melions*, and ſee whether the *Melons* will not be more Winy, and better taſted. Set *Cucumbers* (likewiſe) amongſt *Radiſh*, and ſee whether the *Radiſh* will not be made the more Biting. 486

Take *Sorrell*, and ſet it amongſt *Raſpes*, and ſee whether the *Raſpes* will not bee the ſweeter. 487

Take *Common Briar*, and ſet it amongſt *Violets*, or *Wall-Flowers*, and ſee whether it wil not make the *Violets*, or *Wall-Flowers* ſweeter, and leſſe Earthy in their Smell. So ſet *Lettuce*, or *Cucumbers*, amongſt *Roſemary*, or *Bayes*, and ſee whether the *Roſemary*, or *Bayes*, will not be the more Odorate, or Aromaticall. 488

Contrariwiſe, you muſt take heed, how you ſet *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Roſemary* will leeſe in Sweetneſſe if it be ſet with *Lauender*, or *Bayes*, or the like. But yet, if you wil correct the ſtrength of an Herbe, you ſhall do well to ſet other like Herbs by him, to take him downe; As if you ſhould ſet *Tanſey* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you ſhould ſet *Rew* by *Common Worme-wood*, it may be, the *wormewood* would turne to be liker *Roman Wormewood*. 489

This *Axiome* is of large extent; And therefore would be ſeuered, and refined by *Triall*. Neither muſt you expect to haue a *Groſſe Difference* by this kinde of Culture, but only *Further Perfection*. 490

Triall would be alſo made in *Herbs Poiſonous*, and *Purgatiue*, whoſe ill Quality (perhaps) may be diſcharged, or attempted, by Setting ſtronger *Poiſons*, or *Purgatiues*, by them. 491

It is reported, that the *Shrub* called *Our Ladies Seale*, (which is a Kind of *Briony*,) and *Coleworts*, ſet neere together, one or both will die. The *Cauſe* is, for that they bee both great Depredatours of the Earth, and one of them ſtarueth the other. The like is ſaid of a *Reed*, and a *Brake*; Both which are ſucculent; And therefore the One deceiueth 492

ceiueth the Other. And the like of *Hemlocke* and *Rew*, Both which draw ſtrong Iuyces.

493 Some of the Ancients, and likewiſe diuers of the Moderne Writers, that haue laboured in *Naturall Magick*, haue noted a *Sympathy*, between the *Sunne*, *Moone*, and ſome Principall *Starres*; And certaine *Herbs*, and *Plants*. And ſo they haue denominated ſome *Herbes Solar*, and ſome *Lunar*; And ſuch like Toyes put into great Words. It is manifeſt, that there are ſome *Flowers*, that haue *Reſpect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mari-golds*, *Tulippa's*, *Pimpernell*, and indeed moſt *Flowers*, doe open or ſpread their leaues abroad, when the *Sunne* ſhineth ſerene and faire: And againe, (in ſome part,) cloſe them, or gather them inward, either towards Night, or when the Skie is ouer caſt. Of this there needeth no ſuch Solemne Reaſon to be aſſigned; As to ſay, that they reioyce at the Preſence of the Sunne; And mourne at the Abſence thereof. For it is Nothing elſe, but a little Loading of the Leaues, and Swelling them at the Bottome, with the Moiſture of the Aire, whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clauer* will hide the *Stalke*, when the *Sunne* ſheweth bright; Which is Nothing, but a full Expanſion of the leaues, For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mari-golds*; *Wart-wort*; *Mallow Flowers*, and others. The *Cauſe* is ſomewhat more Obſcure than the former; But I take it to be no other, but that the Part againſt which the *Sunne* beateth, waxeth more faint and flaccide in the Stalke; And thereby leſſe able to ſupport the *Flower*.

494 What a little *Moiſture* will doe in *Vegetables*, euen though they be dead, and ſeuered from the Earth, appeareth well in the *Experiment* of *Iuglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottome, and one ſmooth entire Straw at the Top. They take only the Part that is Wreathed, and cut off the other, leauing the *Beard* halfe the Breadth of a finger in length. Then they make a little *Croſſe* of a *Quill*, long-waies, of that Part of the *Quill*, which hath the Pith; And Croſſe-waies of that peece of the *Quill*, without Pith; The whole *Croſſe* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leauing halfe of it ſticking forth of the *Quill*: Then they take a little white Box of wood, to deceiue Men, as if ſomewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Croſſe* ſinke downe, but to ſticke. Then likewiſe by way of Impoſture, they make a Queſtion; As, who is the Faireſt Woman in the Company? Or, Who hath a Gloue, or Card? And cauſe another to name diuers Perſons: And vpon euery Naming, they ſticke the *Croſſe* in the Box, hauing firſt put it towards their Mouth, as if they charmed it; And the *Croſſe* ſtirreth not; But when they come to the Perſon that they would take; As they hold the *Croſſe* to their mouth,

they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the vntwining of the *Beard* by the Moisture. You may see it more euidently, if you sticke the Crosse betweene your Fingers, in Stead of the Box; And therefore you may see, that this Motion, which is effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herbe* called *Rosa-Solis*, (whereof they make Strong Waters,) will at the Noone day, when the *Sunne* shineth hot and bright, haue a great Dew vpon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the Sunne. Men fauour Wonders. It were good first to bee sure, that the Dew that is found vpon it, bee not the Dew of the Morning Preserued, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Leafe, that doth not discharge the Dew so soone, as other *Herbs* that are more Spungy and Porous. And it may bee *Purslane*, or some other Herbe, doth the like, and is not marked. But if it bee so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to bee an Exudation of the *Herbe* it selfe. As Plums sweat when they are set into the Ouen: for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Wooll*, that the *Dew* should fall vpon that, and no where else. 495

It is certaine, that the *Honey-dewes* are found more vpon *Oake-leaues*, than vpon *Ash*, or *Beech*, or the like; But whether any *Cause* bee, from the *Leafe* it selfe, to concoct the *Dew*; Or whether it bee onely, that the *Leafe* is Close and Smooth; (And therefore drinketh not in the Dew, but preserueth it;) may bee doubted. It would bee well inquired, whether *Manna* the *Drug*, doth fall but vpon certaine *Herbs* or *Leaues* onely. *Flowers* that haue deepe *Suckets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*. 496

The Experience is, that the *Froth*, which they call *Woodsoare*, (being like a kinde of Spittle,) is found but vpon certaine *Herbs*, and those Hot Ones; As *Lauender*, *Lauender-cotton*, *Sage*, *Hissope*, &c. Of the *Cause* of this enquire further; For it seemeth a Secret. There falleth also *Mildew* vpon *Corne*, and smutteth it; But it may be, that the same falleth also vpon other *Herbs*, and is not obserued. 497

It were good, Triall were made, whether the great Consent betweene *Plants* and *water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch onely. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canuasse: Fill it with Earth aboue the Canuasse, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But vnder the Canuasse, some halfe a foot in the Bottome of the Vessell, lay a great *Spunge*, thorowly wet in water; And let it lye so some ten Dayes; And see 498

see whether the *Seeds* will sprout, and the *Earth* become more Moist, and the *Sponge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is farre stranger than this.

Experiments in Consort, touching the *Making Herbs* and *Fruits Medicinable*.

499

THe *Altering* of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting into the Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things habe passed their Period, and nourish not. And all *Alterations* of Vegetables, in those Qualities, must bee by somewhat that is apt to goe into the Nourishment of the *Plant*. But this is true; that where Kine feed vpon *Wilde Garlicke*, their *Milke* tasteth plainely of the *Garlicke*; And the Flesh of *Mutton* is better tasted where the *Sheepe* feed vpon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth but vpon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rose-Mary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Meadow* that was fed with *Napellus*; (which is counted the strongest Poyson of all *Vegetables*;) which with vse did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is obserued by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth vpon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleyes, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempered with diuers Powders; So of *Meat* also (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may bee made of great vse for *Medicine*, and *Diet*, if the *Beasts*, *Foule*, or *Fish*, be fed with a speciall kinde of food fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may bee applied vnto *Plants*, and *Herbs*, I doubt: nay I; Because the Nourishment of them is a more common Iuyce; which is hardly capable of any speciall Quality, vntill the *Plant* doe assimilate it.

500

But lest our Incredulity may preiudice any profitable Operations in this kinde, (especially since Many of the Ancients haue set them downe,) We thinke good briefly to propound the fowre *Meanes*, which they haue deuised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it vp againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides it is a long time in Going vp, ere it come to the *Fruit*. The Second is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue be received from the *Medicine*, it hath the lesse way, and the lesse time, to goe vp. The Third is, the Steeping of the *Seed* or *Kernell* in some *Liquor*, wherein

in the *Medicine* is *Infused* : Which I haue little Opinion of, becauſe the *Seed* (I doubt,) will not draw the Parts of the *Matter*, which haue the *Propriety* : But it will bee farre the more likely, if you mingle the *Medicine* with *Dung* ; For that the *Seed* naturally drawing the *Moiſture* of the *Dung*, may call in withall ſome of the *Propriety*. The fourth is, the *Watring* of the *Plant oft*, with an *Infuſion* of the *Medicine*. This, in one reſpect, may haue more force than the reſt ; Becauſe the *Medication* is oft renewed ; Whereas the reſt are applyed but at one time : And therefore the Vertue may the ſooner vaniſh. But ſtill I doubt, that the *Roots* is ſomewhat too ſtubborne to receiue thoſe fine *Impreſſions* ; And beſides, (as I ſaid before,) they haue a great *Hill* to goe vp. I iudge therefore the likelieſt way to be the *Perforation of the Body* of the *Tree*, in *ſeuerall Places, one aboue the other* ; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of thoſe *Lumps* of *Dung*, with Squirts of an *Infuſion* of the *Medicine* in *Dunged Water*, once in three or foure Dayes.

NATV-

NATVRALL HISTORIE.

VI. Century.

OVR *Experiments* we take care to be (as we haue often said) either *Experimenta Fructifera*, or *Lucifera*; either of *Vse*, or of *Discouery*: For we hate *Impostures*; And despise *Curiosities*. Yet because we must apply our selues somewhat to others, we will set downe some *Curiosities* touching *Plants*.

Experiments in Consort touching *Curiosities* about *Fruits* and *Plants*.

It is a *Curiosity*, to haue *seuerall Fruits* vpon *one Tree*; And the more, when some of them come *Early*, and some come *Late*; So that you may haue vpon the same *Tree*, Ripe *Fruits* all Sommer. This is easily done, by Grafting of seuerall *Cions*, vpon seuerall Boughes, of a Stock, in a good Ground, plentifully fed. So you may haue all Kindes of *Cherries*, and all kindes of *Plums*, and *Peaches*, and *Apricots*, vpon one *Tree*; But I conceiue the *Diuersity* of *Fruits* must be such, as will graft vpon the same Stocke. And therefore I doubt, whether you can haue *Apples*, or *Peares*, or *Orenges*, vpon the same Stocke, vpon which you grafe *Plummes*.

It is a *Curiosity* to haue *Fruits* of *Diuers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may haue *Cucumbers*, &c. as Long

as a Cane; Or as Round as a Spheare; Or formed like a Croſſe. You may haue alſo *Apples*, in the forme of *Peares*, or *Limons*. You may haue alſo *Fruit* in more Accurate Figures; As we ſaid of *Men*, *Beaſts*, or *Birds*, according as you make the Moulds. Wherein you muſt vnderſtand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greateſt: For elſe you will choake the Spreading of the *Fruit*: Which otherwiſe would ſpread it ſelfe, and fill the Concaue, and ſo be turned into the *Shape* deſired; As it is in Mouldworkes of Liquid Things. Some doubt may bee conceiued, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinarie experience of *Fruit* that groweth Couered. *Quare* alſo, whether ſome ſmall Holes, may not be made in the Wood, to let in the Sunne. And note, that it were beſt to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curioſity*, to haue *Inſcriptions*, or *Engrauings*, in *Fruit*, or *Trees*. This is eaſily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, ſo the Letters will grow more large, and Graphicall.

——Teneris ſi mecs incidere Amores
Arboribus, creſcent illæ, creſcetis Amores.

504 You may haue *Trees apparelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and ſuch like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with ſome Feeding from the *Trees*. It would be tried alſo with *Shoots* of *Vines*, and *Roots* of *Red-Roſes*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it ſelfe.

505 It is an ordinary *Curioſity*, to *Forme Trees* and *Shrubs*, (as *Roſemary*, *Iuniper*, and the like,) into *ſundry Shapes*; which is done by Moulding them within, and cutting them without. But they are but lame Things, being too ſmall to keepe Figure: Great *Caſtles* made of *Trees* vpon Frames of Timber, with Turrets, and Arches, were matters of Magnificence.

506 Amongſt *Curioſities*, I ſhall place *Colouration*, though it be ſomewhat better: For *Beauty* in *Flowers* is their Preheminence. It is obſerued by ſome, that *Gilly-Flowers*, *Sweet williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watred, nor New Moulded, nor Tranſplanted, will turne *White*. And it is probable, that the *white* with much culture, may turne *Coloured*. For this is certaine, that the *white Colour* commeth of Scarcity of Nourishment; Except in Flowers that are onely *white*, and admit no other *Colours*.

507 It is good therefore, to ſee what *Natures* doe accompany what *Colours*; For by that you ſhall haue Light, how to induce *Colours*, by Producing thoſe *Natures* whither are more Inodorate, (for the moſt part,) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly Flowers*, &c. We finde also, that *Blossomes* of *Trees*, that are *white*, are commonly Inodorate; As *Cherries*, *Peares*, *Plummes*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are Blushy, and smell sweet. The *Cause* is, for that the Substance that maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to bee of so dainty *Colours*. And if it bee too Sparing, and Thinne, it attaineth no Strength of Odour; Except it be in such *Plants*, as are very Succulent; Whereby they need rather to be scanted in their Nourishment, than replenished, to haue them sweet. As we see in *white Satyrion*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* bee of Nature, to put forth *white-Flowers* onely, and those not thinne, or dry, they are commonly of rancke and fulsome Smell; As *May-Flowers*, and *white Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the *Coloured*; As we see in *White Grapes*; In *white Raspes*; In *White Strawberries*; In *white Currans*, &c. The *Cause* is, for that the *Coloured* are more iuyced, and courser iuyced; And therefore not so well and equally Concocted; But the *white* are better proportioned, to the Disgestion of the *Plant*. 508

But in *Fruits*, the *White* commonly is meaner; As in *Peare-plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harvest White-Plumme*, is a base *Plumme*; And the *Verdoccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all Ouer-watry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste; And therefore all your dainty *Plummes*, are a little dry, and come from the Stone; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to bee *Blacke*, are of the Nature of *Berries*, sweetest such as are Paler; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowre. 509

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clone-Gilly-Flower*, which is the most Common;) And sow it; And there will come vp *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may haue two or three *Roots* amongst an hundred, that are rare, and of great Price: As *Purple*, *Carnation* of seuerall *Stripes*; The *Cause* is (no doubt) that in *Earth*, though it be contiguous, and in one Bed, there are very seuerall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come vp *Purple*, doe alwaies come vp Single; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of seuerall *Co-* 510

lours, comming vp from one *Seed*, would bee tried also in *Larkes-foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

511 Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*, *Mulberries* likewise; and *Grapes*, though most toward the Skinne. There is a *Peach* also, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they haue (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired.

512 The Generall *Colour* of *Plants* is *Greene*; which is a *Colour* that no *Flower* is of. There a *Greenish Prime-Rose*, but it is *Pale* and scarce a *Greene*; The *Leaues* of some *Trees* turne a little *Murry*, or *Reddish*; And they be commonly *Young Leaues* that doe so; As it is in *Oakes*, and *Vines*, and *Hasle*. *Leaues* rot into a *Yellow*; And some *Hollies* haue part of their *Leaues Yellow*, that are, (to all seeming,) as Fresh and Shining, as the *Greene*. I suppose also, that *Yellow* is a lesse Succulent *Colour*, than *Greene*; And a degree neerer *White*. For it hath beene noted, that those *Yellow Leaues* of *Holly* stand euer towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Blood-Red*, Stalke and Leafe, and all; as *Amaranthus*. Some *Herbs* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some haue *White Leaues*; as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure*, and a *Faire Purple*, are neuer found in *Leaues*. This sheweth, that *Flowers* are made of a Refined Iuyce, of the Earth; And so are *Fruits*: But *Leaues* of a more Course, and Common.

513 It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Remouing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not Remouing, proue *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips* of *Flowers*; And as soone as they come vp, to remoue them into New Ground, that is good. Enquire also, Whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Musk-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*; But that *Tree* beareth no *Fruit*; And, it may be, that the same Meanes, which applied to the *Tree*, doth extremely accelerate the Sap to rise, and breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that haue *Blossomes Blush-Coloured*.

514 The *Making* of *Fruits*, without *Core* or *Stone*, is likwise a *Curiosity*; And somewhat better: Because whatsoeuer maketh them so, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be set in the Ground, haue the *Pith* finely taken forth, (and not altogether, but some of it left, the better to saue the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to bee, of diuiding a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it vp againe.

It

It is reported alſo, that a *Citron* grafted vpon a *Quince*, will haue ſmal or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted vpon a *Stock*, that beareth a *Sweeter Fruit*, may both make the *Fruit* ſweeter, and more void of the harſh matter of *Kernels* or *Seeds*. 551

It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from Riſing in the Middeſt, and *Turning* it to riſe on the Outſide, will make the *Fruit* without *Core*, or *Stone*; As if you ſhould bore a *Tree* cleane thorow, and put a wedge in. It is true, there is ſome Affinity betweene the *Pith* and the *Kernell*, becauſe they are both of a harſh Subſtance, and both placed in the Middeſt. 516

It is reported, that *Trees watered* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core*, or *Stone*: And the Rule is generall, that whatſoeuer will make a *Wild Tree a Garden-Tree*, will make a *Garden-Tree* to haue leſſe *Core*, or *Stone*. 517

Experiments in Conſort touching the *Degenerating* of *Plants*; And of the *Tranſmutation* of them, one into another.

THe Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baſer in the ſame Kind; And ſometimes, ſo farre, as to change into another Kinde. 1. The *Standing long*, and not being *Remoued*, maketh them *degenerate*. 2. *Drought*, vnleſſe the Earth of it ſelfe be moiſt, doth the like. 3. So doth *Remouing into worſe Earth*, or *Forbearing to Compoſt the Earth*; As we ſee, that *Water-Mint* turneth into *Field-Mint*; And the *Colewort* into *Rape* by neglect, &c. 518

Whatſoeuer *Fruit* vſeth to be ſet vpon a *Root* or a *Slip*, if it be *ſowne*, will *degenerate*. *Grapes ſowne*; *Figs*, *Almonds*, *Pomgranate Kernels ſowne*; make the *Fruits degenerate*, and become Wilde. And againe, Moſt of thoſe *Fruits* that vſe to bee *grafted*, if they be ſet of *Kernels*, or *Stones*, *degenerate*. It is true, that *Peaches* (as hath beene touched before) doe better vpon *Stones Set*, than vpon *Grafting*; And the Rule of Exception ſhould ſeeme to be this; That whatſoeuer *Plant* requireth much Moiſture, proſpereth better vpon the *Stone*, or *Kernell*, than vpon the *Graft*. For the Stocke, though it giueth a finer Nouriſhment, yet it giueth a ſcanter, than the earth at large. 519

Seeds, if they be very *Old*, and yet haue ſtrength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make triall of the *Seeds*, before they buy them, whether they be good or no, by putting them into Water gently Boyled; And if they bee good, they will ſprout within Halfe an Houre. 520

It is ſtrange which is reported, that *Baſil* too much expoſed to the *Sunne*, doth turne into *wilde Thyme*: Although thoſe two *Herbs* ſeeme to haue ſmall Affinity; but *Baſil* is almoſt the only Hot *Herbe*, that hath Fat and Succulent *Leaues*; Which Oylineſſe, if it be drawn forth by the Sunne, it is like it will make a very great Change. 521

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *wilde Vines*: Which if it be true (no doubt) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it ſelfe. 522

523 It is not impoſſible, and I haue heard it verified, that vpon *Cutting downe* of an Old *Timber Tree*, the *Stub* hath put out ſometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it bee true, the *Cauſe* may be, for that the old *Stub* is too ſcant of Iuyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a ſmaller kinde, that needeth leſſe Nouriſhment.

524 There is an Opinion in the Countrey, that if the ſame *Ground* be *oft ſowne*, with the *Graine* that *grew vpon it*, it will in the end, grow to be of a baſer kinde.

525 It is certaine, that in very *Sterile Teeres*, *Corne ſowne* will grow to *another Kinde*.

Grandia ſæpè quibus mandauimus Hordea Sulcis,
Infœlix Lolium, & ſteriles dominantur Auenæ.

And generally it is a Rule, that *Plants*, that are brought forth by *Culture* as *Corne*, will ſooner change into other *Species*, than thoſe that come of themſelues: For that *Culture* giueth but an Aduentitious Nature, which is more eaſily put off.

This worke of the *Tranſmutation* of *Plants*, one into another, is *inter Magnalia Naturæ*: For the *Tranſmutation* of *Species* is, in the vulgar Philoſophy, pronounced Impoſſible: And certainly, it is a thing of difficulty, and requireth deepe Search into Nature: But ſeeing there appeare ſome manifeſt *Inſtances* of it, the Opinion of Impoſſibility is to bee reiected; And the Meanes thereof to bee found out. Wee ſee, that in *Liuing Creatures*, that come of *Putrefaction*, there is much *Tranſmutation*, of one into another; As *Catterpillars* turne into *Flies*, &c. And it ſhould ſeeme probable, that whatſoeuer *Creature*, hauing life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as wee may well conclude, that ſeeing the Earth, of it ſelfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well haue a *Tranſmigration* of *Species*. Wherefore wanting *Inſtances*, which doe occurre, wee ſhall giue Directions of the moſt likely *Trialls*: And generally, wee would not haue thoſe, that read this our Worke of *Sylua Syluarum*, account it ſtrange, or thinke that it is an Ouer-Haſte, that wee haue ſet downe Particulars vntried; For contrariwiſe, in our owne Eſtimation, wee account ſuch Particulars, more worthy, than thoſe that are al-

ready

ready tried and knowne. For theſe Later muſt be taken as you finde them; But the Other doe leuell Point blanke at the *Inuenting*, of *Cauſes*, and *Axiomes*.

First therefore you muſt make account, that if you will haue one *Plant* change into another, you muſt haue the *Nouriſhment* ouer-rule the *Seed*; And therefore you are to practice it by *Nouriſhments* as contrary as may be, to the *Nature* of the *Herbe*, So neuertheleſſe as the *Herb* may grow; And likewiſe with *Seeds* that are of the Weakeſt Sort, and haue leaſt Vigour. You ſhall doe well therefore, to take *Marſh Herbs*, and Plant them vpon Tops of Hills, ond Champaignes, And ſuch *Plants* as require much Moiſture, vpon Sandy and very dry Grounds. As for Example *Marſh-Mallowes*, and *Sedge*, vpon Hills; *Cucumber* and *Lettuce-Seeds*, and *Colewo.ts*, vpon a *Sandy Plot*: So contrariwiſe plant *Buſhes*, *Heath*, *Ling*, and *Brakes*, vpon a *Wet* or *Marſh Ground*. This I conceiue alſo, that all *Eſculent* and *Garden-Herbs*, ſet vpon the Tops of Hills, will proue more *Medicinall*, though leſſe *Eſculent*, than they were before. And it may be likewiſe, ſome *Wilde-Herbs* you may make *Sallet-Herbs*. This is the firſt Rule for *Tranſmutation* of *Plants*. 526

The ſecond Rule ſhall be to bury ſome few *Seeds*, of the *Herbe* you would change, amongſt other *Seeds*; And then you ſhall ſee, whether the Iuyce of thoſe other *Seeds*, doe not ſo qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parſly-Seed* amongſt *Onion-Seed*; Or *Lettuce-Seed* amongſt *Parſly-Seed*; Or *Baſill-Seed* amongſt *Thyme-Seed*; And ſee the Change of Taſte, or otherwiſe. But you ſhall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*. 527

The third Rule ſhall be, the *Making* of ſome *Medley* or *Mixture* of *Earth*, with ſome other *Plants bruiſed*, or *Shauen*, either in *Leafe* or *Root*: As for example, make *Earth* with a *Mixture* of *Colewort-Leaues*, ſtamped, and ſet in it *Artichoukes*, or *Parſnips*; So take *Earth* made with *Maioram*, or *Origanum*, or *Wilde-Thyme*, bruiſed, or ſtamped, and ſet in it *Fennell-Seed*, &c. In which Operation, the Proceſſe of Nature ſtill will be, (as I conceiue) not that the *Herbe* you worke vpon, ſhould draw the Iuyce of the Forraine *Herbe*; (For that Opinion we haue formerly reiected;) But that there will be a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*. 528

The fourth Rule ſhall be, to marke what *Herbs*, *ſome Earths doe put forth of themſelues*. And to take that *Earth*, and to *Pot* it, or to *Veſſell* it; And in that to ſet the *Seed* you would change: As for example, take from vnder Walls, or the like, where *Nettles* put forth in abundance, the Earth which you ſhall there finde, without any *String*, or *Root*, of the *Nettles*; And Pot that *Earth*, and ſet in it *Stock-gilly-flowres*, or *Wall-flowres*, &c. Or ſow in the *Seeds* of them; And ſee what the Euent will be. Or take *Earth*, that you haue prepared to put forth *Muſh-* 529

romes,

romes, of it selfe, (whereof you shall find some *Instances* following;) And sow in it *Purslane-Seed*, or *Lettuce-Seed*; For in these *Experiments*, it is likely enough, that the earth being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

530 The fifth Rule shall be, to make the *Herbe grow contrary to his Nature*; As to make *Ground-Herbs* rise in *Heighth*: As for example; Carry *Camomill*, or *wilde-Thyme*, or the *Greene Strawberry*, vpon Stickes, as you doe *Hops* vpon Poles; and see what the Euent will be.

531 The sixth Rule shall be, to make *Plants grow out of the Sunne, or Open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell vp *Earth*, and sow some *Seed* in it, and put it in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of Caues; And Pots with *Seeds* sowne, hanged vp in Wells, some distance from the Water, and see what the Euent will be.

Experiments in Consort, touching the *Procerity*, and *Lownesse*, and *Artificial dwarfing* of *Trees*.

532 IT is certaine, that *Timber-Trees* in *Coppice Woods*, grow more vpright, and more free from Vnder-Boughes, than those that stand in the *Fields*: The *Cause* whereof is, for that *Plants* haue a Naturall Motion, to get to the Sunne; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion euer hindreth Stature; Lastly, they are kept warme; And that euer in *Plants* helpeth Mounting.

533 *Trees*, that are, of themselues, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gummes*,) as *Firres*, and *Pines*, mount of themselues in Heigth without Side-Boughes, till they come towards the Top. The *Cause* is, partly Heat; And partly Tenuity of Iuyce; Both which send the Sap vpwards. As for *Iuniper*, it is but a *Shrub*, and groweth not big enough in Body, to maintaine a tall *Tree*.

534 It is reported, that a Good Strong *Canuas*, spread ouer a *Tree* grafted low, some after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all things that grow, will grow as they finde Roome.

535 *Trees* are generally set of *Roots*, or *Kernels*; But if you set them of *Slips* (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

536 All *Plants*, that put forth their *Sap* hastily, haue their Bodies not proportionable to their Length; And therefore they are *Winders*, and *Creepers*; As *Ivy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse Vigour of Mounting.

Experiments in Consort touching the

The *Scripture* saith; that *Salomon* wrote a *Naturall History*, from the *Cedar* of *Libanus*, to the *Mosse growing vpon the Wall*:

For

For to the best *Translations* haue it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, of *Barke*.

Rudiments of Plants, and of the Excrescenses of Plants, or Super-Plants.

537 *Mosse* groweth chiefly vpon *Ridges* of *Houses*, tiled or thatched; And vpon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant Greene, The Growing vpon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of Moisture and Water, so on the other side the *Water* must but Slide, and not Stand or Poole. And the *Growing* vpon *Tiles*, or *walls*, &c. is caused, for that those dried Earths, hauing not Moisture sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by Age, or otherwise, they grow to relent and resolue, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little Stalkes, besides the low Thrumme.

538 *Mosse* groweth vpon *Alleyes*, especially such as lye Cold, and vpon the North; As in diuers Tarrasses: And againe, if they be much trodden; Or if they were, at the first, grauelled; for wheresoeuer *Plants* are kept downe, the Earth putteth forth *Mosse*.

539 *Old Ground*, that hath beene long vnbroken vp, gathereth *Mosse*: And therefore Husbandmen vse to cure their *Pasture Grounds*, when they grow to *Mosse*, by Tilling them for a yeare, or two: Which also dependeth vpon the same *Cause*; For that, the more Sparing, and Staruing Iuyce of the Earth, insufficient for *Plants*, doth breed *Mosse*.

540 *Old Trees*, are more *Mossie*, (farre) than *Young*; For that the Sap is not so francke as to rise all to the Boughes, but tireth by the way; and putteth out *Mosse*.

541 *Fountaines* haue *Mosse* growing vpon the *Ground* about them;

Muscosi Fontes;———

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground Adiacent*, and leaue but sufficient Moisture to breed *Mosse*: And besides, the *Coldnesse* of the *Water*, conduceth to the same.

542 The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is Excerned, and doth not Assimilate. And vpon great *Trees* the *Mosse* gathereth a Figure, like a *Leafe*.

543 The *Moister Sort* of *Trees* yeeld little *Mosse*; As wee see in *Asspes*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the reason that hath beene giuen, of the francke Putting vp of the *Sap* into the *Boughes*; And partly, for that the *Barkes* of those *Trees*, are more Close and Smooth, than those of *Oakes*, and *Ashes*; Whereby the *Mosse* can the hardlier issue out.

544 In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both vpon *Body* and *Boughes*; Which is caused, partly by the *Coldnesse* of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get up, to spread so franckly, as it should doe.

We

545 We haue ſaid heretofore, that if *Trees* be *Hide-bound*, they wax leſſe Fruitfull, and gather *Moſſe*: And that they are holpen by *Hacking*, &c. And therefore by the reaſon of Contraries, if *Trees* bee bound in with *Cords*, or ſome Outward *Bands*, they will put forth more *Moſſe*: Which (I thinke) happeneth to *Trees* that ſtand Bleake, and vpon the Cold Winds. It would alſo be tried, whether if you couer a *Tree*, ſomewhat thicke vpon the top, after his Powling, it will not gather more *Moſſe*. I thinke alſo, the *Watring* of *Trees* with *Cold Fountaine-Water*, will make them grow full of *Moſſe*.

546 There is a *Moſſe* the *Perfumers* haue, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quære* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* ſake, being a Thing of Price, I haue ſet downe the laſt *Experiments*, how to multiply, and call on *Moſſes*.

Next vnto *Moſſe*, I will ſpeake of *Muſhromes*; Which are likewiſe an *Vnperfect Plant*. Theſe *Muſhromes* haue two ſtrange *Properties*; The One, that they yeeld ſo *Delicious* a *Meat*; The other, that they *come vp* ſo *haſtily*; As in a *Night*; And yet they are *Vnſowne*. And therefore, ſuch as are Vp-ſtarts in State, they call, in reproach, *Muſhromes*. It muſt needs be therefore, that they bee made of much *Moiſture*; And that *Moiſture* Fat, Groſſe, and yet ſomewhat Concocted. And (indeed) we finde that *Muſhromes* cauſe the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyſon. And this ſheweth, that they are Windy; And that Windineſſe is Groſſe, and Swelling; Not Sharpe, or Griping. And vpon the ſame reaſon *Muſhromes* are a venereous Meat.

547 It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moiſteſt of *Trees*,) cut ſmall, and caſt into *Furrowes* well dunged, will cauſe the Ground to put forth *Muſhromes*, at all *Seaſons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leauen* of *Bread*, reſolued in *water*.

548 It is reported, that if a *Hilly-Field*, where the *Stubble* is ſtanding, bee ſet on *Fire*, in a *Showrie Seaſon*, it will put forth great Store of *Muſhromes*.

549 It is reported that *Harts-Horne*, *Shauen*, or in *Small Peeces*, mixed with *Dung*, and *watred*, puttreth vp *Muſhromes*. and we know *Harts-Horne* is of a Fat and Clammie Subſtance: And it may be *Oxe-Horne* would doe the like.

550 It hath beene reported, though it be ſcarce credible, that *Ivy* hath growne out of a *Stags-Horne*; Which they ſuppoſe, did rather come from

from a *Confrication* of the *Horne* vpon the *Iuy*, than from the *Horne* it ſelfe. There is not knowne any Subſtance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Moſſe*, or *Herby Subſtance*. There may be triall made of ſome *Seeds*, as that of *Fennell-Seed*, *Muſtard-Seed*, and *Rape-Seed*, put into ſome little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to ſee if they will grow.

There is alſo another *Vnperfect Plant*, that (in ſhew) is like a great *Muſhrome*: And it is ſometimes as broad as ones Hat, Which they call a *Toads-Stoole*: But it is not Eſculent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewiſe about the *Roots* of *Rotten Trees*: And therefore ſeemeth to take his Iuyce from *Wood Putrified*. Which ſheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moiſture*. 551

There is a *Cake*, that groweth vpon the ſide of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Cheſnut Colour, and hard, and pithy; Whereby it ſhould ſeeme, that euen *Dead Trees* forget not their Putting forth; No more than the *Careaſſes* of *Mens Bodies*, that put forth *Haire*, and *Nailes*, for a Time. 552

There is a *Cod*, or *Bagge*, that groweth commonly in the *Fields*; That at the firſt is hard like a *Tennis-Ball*, and white; And after groweth of a *Muſhrome Colour*, and full of light *Duſt* vpon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to bee good for *Kibes*. Belike it hath a *Corroſiue*, and *Fretting Nature*. 553

There is an *Herbe* called *Iewes-Eare*, that groweth vpon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Eſpecially of *Elders*, and ſometimes *Aſhes*. It hath a ſtrange Property; For in *Warme-water*, it ſwelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is vſed for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it ſeemeth to haue a Mollifying, and Lenifying Vertue. 554

There is a Kinde of *Spongie Excreſcence*, which groweth chiefly vpon the *Roots* of the *Laſer-Tree*; And ſometimes vpon *Cedar*, and other *Trees*. It is very White, and Light, and Friable: Which we call *Agaricke*. It is famous in *Phyſicke* for the *Purging* of *Tough flegme*. And it is alſo an excellent *Opener* for the *Liuer*: But Offenſiue to the *Stomacke*, And in *Taſte* it is, at the firſt, *Sweet*, and after *Bitter*. 555

We finde no *Super-Plant*, that is a Formed *Plant*, but *Miſſeltoe*. They haue an idle Tradition, that there is a *Bird*, called a *Miſſel-bird*, that feedeth vpon a *Seed*, which many times ſhe cannot diſgeſt, and ſo expelleth it whole with her Excrement: which falling vpon a *Bough* of a *Tree* that hath ſome Rif, putteth forth the *Miſſeltoe*. But this is a Fable: For it is not probable, that *Birds* ſhould feed vpon that they cannot diſgeſt. But allow that, yet it cannot be for other Reaſons: For firſt, it is found but vpon certaine *Trees*; And thoſe *Trees* beare no ſuch *Fruit*, as may allure that *Bird* to ſit, and feed vpon them. It may be, that *Bird* feedeth vpon the *Miſſeltoe Berries*, and ſo is often found there; Which may haue giuen occaſion to the Tale. But that which maketh an End of the Queſtion 556

ſtion, is, that *Miſſeltoe* hath beene found to put forth vnder the *Boughes*, and not (only) aboue the *Boughes*: So it cannot be any Thing that falleth vpon the *Bough*. *Miſſeltoe* groweth chiefly vpon *Crab-Trees*, *Apple-Trees*, ſometimes vpon *Haſles*; And rarely vpon *Oakes*; The *Miſſeltoe* whereof is counted very *Medicinall*. It is euer greene, Winter and Summer; And beareth a *white Gliſtering Berry*: And it is a *Plant* vtterly differing from the *Plant*, vpon which it groweth. Two things therefore may be certainly ſet downe: Firſt, that *Super-Jetation* muſt be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* muſt be ſuch, as the *Tree* doth excerne, and cannot aſſimilate; For elſe it would goe into a *Bough*; And beſides, it ſeemeth to bee more Fat and Vnctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Miſſeltoe* may giue Light to other Practiſes. Therefore Triall would bee made, by ripping of the *Bough* of a *Crab-Tree* in the *Barke*; And *watring* of the wound euery Day, with *warme Water Dunged*, to ſee if it would bring forth *Miſſeltoe*, or any ſuch like Thing. But it were yet more likely to trie it, with ſome other *Watring*, or *Anointing*, that were not ſo Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they bee ſuch Things as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and couer it, ſome thickneſſe, with *Clay* on the Top; And ſee what it will put forth. I ſuppoſe it will put forth *Roots*; For ſo will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* alſo, the *Tree* would be cloſed with ſomewhat, that is not ſo Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, ſo it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A man may count the *Prickles* of *Trees* to be a kinde of *Extreſcence*; For they will neuer be *Boughes*, nor beare *Leaues*. The *Plants* that haue *Prickles*, are *Thornes*, blacke and white; *Brier*; *Roſe*; *Limon-Trees*; *Crab-Trees*; *Gooſe-Berry*; *Berbery*; Theſe haue it in the *Bough*; The *Plants* that haue *Prickles* in the *Leaſe*, are; *Holly*; *Iuniper*; *Whin-buſh*; *Thiſtle*; *Nettles* alſo haue a ſmall venomous *Prickle*; So hath *Burrage*, but harmeleſſe. The *Cauſe* muſt be *Haſty Putting forth*; *Want* of *Moiſture*; And the *Cloſeneſſe* of the *Barke*; For the *Haſte* of the *Spirit to put forth*, and the *Want* of *Nouriſhment* to put forth a *Bough*, and the *Cloſeneſſe* of the *Barke*, cauſe *Prickles* in *Boughes*; And therefore they are euer like a *Pyramis*, for that the *Moiſture* ſpendeth after a little Putting forth. And for *Prickles* in *Leaues*, they come alſo of *Putting forth more Iuyce* into the *Leaſe*, than can ſpread in the *Leaſe* ſmooth; And therefore the *Leaues* otherwiſe are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaues* of *Holly*, they are *Smooth*, but neuer *Plaine*, but as it were with *Folds* for the ſame *Cauſe*.

There

There bee also *Plants*, that though they haue no *Prickles*, yet they haue a kinde of *Downy* or *Veluet Rine*, vpon their *Leaues*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe*, or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, haue beene applyed, (with successe) to the *wrests* of those that haue had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanatiue vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*. 560

Another Kinde of *Excrescense* is an *Exudation* of *Plants*, ioyned with *Putrefaction*; As wee see in *Oake-Apples*, which are found chiefly vpon the *Leaues* of *Oakes*; And the like vpon *willowes*: And Countrey People haue a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *wormes*, it is a Signe of a *Pestilent Yeere*; Which is a likely Thing, because they grow of Corruption. 561

There is also vpon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of diuers Colours; Which if you cut, you shall euer finde full of little white *wormes*. 562

IT is certaine, that *Earth*, taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundry Kinds of *Herbs*: But some *Time* is required, for the *Germination*; for if it be taken, but from a *Fathome* deepe, it will put forth the *First Yeere* If much deeper, not till after a *Yeere*, or *Two*. Experiments in Consort touching the *Producing* of *Perfect Plants* without *Seed*.

The *Nature* of the *Plants* growing out of *Earth* so taken vp, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Grasse*, *Plantine*, and the like; If the *Earth* be Harder and Courser, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c. 563 564

It is Common *Experience*, that where *Alleyes* are close *Grauelled*, the *Earth* putteth forth, the first yeere, *Knot-grasse*, and after *Spire-grasse* The *Cause* is, for that the *Hard Grauell*, or *Pebble* at the first Laying, will not suffer the *Grasse* to come forth vpright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the Top, the Ordinary *Grasse* commeth vp. 565

It is reported, that *Earth*, being taken out of *Shady* and *watry woods*, some depth, and Potted, will put forth *Herbs* of a Fat and Iuycy Substance; As *Penny-wort*, *Purslane*, *Housleeke*, *Penny royall*, &c. 566

The *Water* also doth send forth *Plants*, that haue no *Roots* fixed in the Bottome; But they are lesse *Perfect Plants*, being almost but *Leaues*, and those small ones: Such is that wee call *Duck-Weed*, which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher Greene, and putteth forth a little *String* into the *Water*, farre from the Bottome. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so haue a Number of other *Herbs* that grow in *Ponds*. 567

It is reported by some of the *Ancients*, and some *Moderne Testimony* likewise, that there be some *Plants*, that grow vpon the Top of the *Sea*; 568

Being ſuppoſed to grow of ſome *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* ſtirreth little. As for *Alga Marina* (*Sea-weed*,) *and Eryngium* (*Sea Thiſtle*) both haue *Roots*; but the *Sea-weed* vnder the *Water*, the *Sea-Thiſtle* but vpon the *Shore*.

569 The Ancients haue noted, that there are ſome *Herbs*, that grow out of *Snow*, laid vp cloſe together, and *Putrified*; And that they are all *Bitter*; And they name one ſpecially, *Flomus*, which we call *Moth-Mullein*. It is certaine, that *Wormes* are found in *Snow* commonly, like *Earth-wormes*; And therefore it is not vnlike, that it may likewiſe put forth *Plants*.

570 The *Ancients* haue affirmed, that there are ſome *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* haue bin found in the Middle of a Free-Stone. Wee ſee alſo, that *Flints*, lying aboue *Ground*, gather *Moſſe*; And *Wall-flowers*, and ſome other *Flowers*, grow vpon *Walls*; But whether vpon the Maine *Bricke*, or *Stone*, or whether out of the *Lime* or *Chinkes*, is not well obſerued; For *Elders* and *Aſhes* haue beene ſeene to grow out of *Steeples*: But they manifeſtly grow out of *Clefts*; In ſo much as when they grow big, they will diſioyne the *Stone*. And beſides it is doubtfull, whether the *Mortar* it ſelfe putteth it forth, or whether ſome *Seeds* be not let fall by *Birds*. There be likewiſe *Rocke-Herbs*; But I ſuppoſe thoſe are, where there is ſome *Mould* or *Earth*. It hath likewiſe beene found, that great *Trees* growing vpon *Quarries*, haue put downe their *Root* into the *Stone*.

571 In ſome *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*; And the *Work-Folkes* vſe to ſay, they haue *Magicall Vertue*; And will not ſuffer Men to gather them.

572 The *Sea-Sands* ſeldome beare *Plants*. Whereof the *Cauſe* is yeelded, by ſome of the *Ancients*, for that the *Sunne* exhaleth the *Moiſture*, before it can incorporate with the *Earth*, and yeeld a Nouriſhment for the *Plant*. And it is affirmed alſo, that Sand hath (alwaies) his *Root* in *Clay*; And that there be no Veines of *Sand*, any great depth within the *Earth*.

573 It is certaine, that ſome *Plants* put forth for a time, of their owne *Store*, without any *Nouriſhment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment* 29.

Experiments in Conſort touching Forraine Plants.

574 IT is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballaſt* of *Ships*, caſt vpon ſome *Grounds* in *Italy*, did put forth *Forraine Herbs*, to vs in *Europe* not knowne; And that which is more, that of their *Roots*, *Barkes*, and *Seeds*, contuſed together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs* much like the Other.

575 *Plants* brought out of *Hot Countries*, will endeuour to put forth, at the ſame *Time*, that they vſually do in their owne *Climate*; And therfore to preſerue them, there is no more required, than to keepe them from the Iniury of Putting backe by *Cold*. It is reported alſo, that *Graine* out

of

of the *Hotter Countries* tranſlated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrie*. It is likely, that this will proue better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And ſo the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is emboſed by the *Ground*, to which it is Remoued.

576 Many *Plants*, which grow in the *Hotter Countries*; being ſet in the *Colder*, will neuertheleſſe, euen in thoſe *Cold Countries*, being ſowne of *Seeds* late in the *Spring*, come vp and abide moſt Part of the *Summer*; As wee finde it in *Orenge* and *Limon-Seeds*, &c. The *Seeds* whereof, Sowne in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not but the *Seeds* of *Cloue-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be ſowne, would doe the like.

Experiments in Conſort, touching the *Seaſons* in which *Plants* come forth.

577 THere be ſome *Flowers*, *Bloſſomes*, *Graines*, and *Fruits*, which come more *Early*, And Others which come more *Late* in the *Yeere*. The *Flowers* that come early, with vs, are; *Prime-Roſes*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and ſome early *Tulippa's*. And they are all *Cold Plants*; Which therefore (as it ſhould ſeeme) haue a quicker *Perception*, of the *Heat* of the *Sunne* Increaſing, than the *Hot Herbs* haue; As a *Cold Hand* will ſooner finde a little *warmth*, than a *Hot*. And thoſe that come next after, are *Wall-Flowers*, *Cowſlips*, *Hyacinths*, *Roſemary-Flowers*, &c. And after them, *Pincks*, *Roſes*, *Flowerdeluces*, &c. And the lateſt are *Gilly-Flowers*, *Holly-oakes*, *Larks-Foot*, &c. The Earlieſt *Bloſſomes* are, the *Bloſſomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of ſuch *Trees*, as haue much *Moiſture*, either *Watrie* or *Oylie*. And therefore *Crocus Vernus* alſo, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For thoſe alſo finde the *Sunne* ſooner than the *Drier Trees*. The *Graines* are, firſt *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Peaſe* and *Beanes*. For though Greene *Peaſe* and *Beanes* be eaten ſooner, yet the Drie Ones, that are vſed for *Horſe-meat*, are ripe laſt; And it ſeemeth that the Fatter *Graine* commeth firſt. The Earlieſt *Fruits* are, *Strawberries*, *Cherries*, *Gooſeberries*, *Corrans*; And after them, *Early Apples*, *Early Peares*, *Apricots*, *Raſps*; And after them *Damaſins*, and moſt Kinde of *Plums*, *Peaches*, &c. And the lateſt are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Seruices*, *Cornelians*, &c.

578 It is to be noted, that (commonly) *Trees* that *ripen lateſt*, *bloſſome ſooneſt*: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it ſeemeth to be a Worke of Prouidence, that they bloſſome ſo ſoone; For otherwiſe, they could not haue the *Sunne* long enough to ripen.

579 There be Fruits (but rarely,) that come *twice a yeare*; as ſome *Peares*, *Strawberries*, &c. And it ſeemeth they are ſuch, as abound with Nouriſhment; Whereby after one Period, before the *Sunne* waxeth too weake, they can endure another. The *Violet* alſo, amongſt *Flowers*, commeth twice a Yeare; Eſpecially the *Double white*; And that alſo

is a *Plant* full of Moisture. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

580 In *Muscouia*, though the *Corne* come not vp, till late *Spring*, yet their *Harueſt* is as Early as Ours. The *Cauſe* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee ſee with vs, that if it bee a long *Winter*, it is commonly a more *Plentifull Yeare*: And after thoſe kinde of *Winters* likewiſe, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the ſame time; Which troubleth the *Husbandman* many times; For you ſhall haue *Red Roſes*, and *Damaske Roſes*, come together; And likewiſe the *Harueſt* of *Wheat* and *Barley*. But this happeneth euer, for that the Earlier ſtayeth for the Later; And not that the Later commeth ſooner.

581 There be diuers *Fruit-Trees*, in the *Hot Countries*, which haue *Bloſſomes*, and *Young Fruit*, and *Ripe Fruit*, almoſt all the Yeare, ſucceeding one another. And it is ſaid, the *Orenge* hath the like with vs, for a great Part of Summer; And ſo alſo hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to haue ſo; But that either they want *Iuyce* to ſpend; Or they meet with the *Cold* of the Winter: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582 Some *Herbs* are but *Annuall*, and die, *Root* and all, once a Yeare; As *Borrage*, *Lettuce*, *Cucumbers*, *Muſk-Melons*, *Baſil*, *Tobacco*, *Muſtard-Seed*, and all kindes of *Corne*; Some continue many Yeeres; As *Hyſſope*, *Germander*, *Lauander*, *Fennell*, &c. The *Cauſe* of the *Dying* is double; The firſt is the *Tenderneſſe* and *Weakneſſe* of the *Seed*, which maketh the Period in a ſmall time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of theſe are Hot. The other *Cauſe* is, for that ſome *Herbs* can worſe endure *Cold*; As *Baſill*, *Tobacco*, *Muſtard-Seed*; And theſe haue (all) much *Heat*.

Experiments in Conſort, touching the *Laſting* of *Herbs* and *Trees*.

583 THe *Laſting* of *Plants* is moſt in thoſe that are *Largeſt* of *Body*; As *Oaks*, *Elme*, *Cheſ-nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largeſt Size*, are of ſmall Durance; Whereas *Hyſſope*, *winter-Sauory*, *Germander*, *Thyme*, *Sage*, will laſt long. The *Cauſe* is, for that *Trees* laſt according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*: Being well munited by their *Barke* againſt the Iniuries of the *Aire*: But *Herbs* draw a Weake *Iuyce*; And haue a Soft *Stalke*; And therefore thoſe amongſt them which laſt longeſt, are *Herbs* of *Strong Smell*, and with a *Sticky Stalke*.

584 *Trees* that beare *Maſt*, and *Nuts*, are commonly more laſting, than thoſe that beare *Fruits*; Eſpecially the *Moiſter Fruits*: As *Oakes*, *Beeches*, *Cheſ-nuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. laſt longer than *Apples*, *Peares*, *Plums*, &c. The *Cauſe* is, the *Fatneſſe*, and *Oylineſſe* of the *Sap*; Which euer waſteth leſſe, than the more *watry*.

585 *Trees*, that bring forth their *Leaues* late in the *Yeere*, and caſt them likewiſe late, are more *laſting*, than thoſe that ſprout their Leaues Early, or

ſhed

ſhed them betimes. The *Cauſe* is, for that the late *Comming forth* ſheweth a *Moiſture* more fixed; And the other more looſe, and more eaſily reſolued. And the ſame *Cauſe* is, that *Wilde Trees* laſt longer than *Garden-Trees*; And in the ſame kinde, thoſe whoſe *Fruit* is Acide, more than thoſe whoſe *Fruit* is ſweet.

Nothing procureth the *Laſting* of *Trees*, *Buſhes*, and *Herbs*, ſo much, as often *Cutting*: For euery *Cutting* cauſeth a Renouation of the *Iuyce* of the *Plant*; That it neither goeth ſo farre, nor riſeth ſo faintly, as when the *Plant* is not *Cut*: Inſomuch as *Annuall Plants*, if you cut them ſeaſonably, and will ſpare the vſe of them, and ſuffer them to come vp ſtill young, will laſt more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Purſlane*, *Cucumber*, and the like. And for *Great Trees*, we ſee almoſt all *Ouer-growne Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height. 586

Some *Experiment* would be made, how by *Art* to make *Plants* more *Laſting* than their ordinary Period; As to make a *Stalke* of *Wheat*, &c. laſt a whole yeare. You muſt euer preſuppoſe, that you handle it ſo, as the *Winter* killeth it not; For we ſpeake only of *Prolonging* the *Naturall Period*. I conceiue, that the *Rule* will hold; That whatſoeuer maketh the *Herbe* come later, than at his time, will make it laſt longer time: It were good trie it, in a *Stalke* of *Wheat*, &c. ſet in the Shade, and encompaſſed with a Caſe of *Wood*, not touching the *Straw*, to keepe out Open *Aire*. 587

As for the Preſeruation *of* Fruits, *and* Plants, *as well vpon the* Tree, *or* Stalke, *as gathered, we ſhall handle it vnder the* Title *of* Conſeruation *of* Bodies.

Experiments in Conſort, touching the ſeuerall *Figures* of *Plants*.

THe *Particular Figures* of *Plants*, we leaue to their *Deſcriptions*; But ſome few things, in generall, we will obſerue. *Trees* and *Herbs*, in the Growing forth of their *Boughes* and *Branches*, are not *Figured*, and keepe no Order. The *Cauſe* is, for that the *Sap*, being reſtrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth caſually, where they finde beſt way, in the *Barke* or *Rinde*. It is true, that ſome *Trees* are more ſcattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almoſt to a Cone; As the *Peare-Tree*, (which the *Criticks* will haue to borrow his name of πῦρ, *Fire*,) *Orenge-Trees*, *Fir-Trees*, *Seruice-Trees*, *Lime-Trees*, &c. And ſome are more ſpred and broad; As *Beeches*, *Hornbeame*, &c. The reſt are more indifferent. The *Cauſe* of Scattering the *Boughes*, is the Haſty breaking forth of the *Sap*; And therefore thoſe *Trees* riſe not in a *Body* of any Height, but branch neere the *Ground*. The *Cauſe* of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the ſpending of it when it beginneth to branch, by equall degrees. The 588

Spreading is cauſed by the *Carrying* vp of the *Sap*, plentifully, without Expence; And then putting it forth ſpeedily, and at once.

589 There bee divers *Herbs*, but no *Trees*, that may be ſaid to haue ſome kinde of Order, in the Putting forth of their *Leaues*: For they haue *Ioynts* or *Knuckles*, as it were Stops in their *Germination*; As haue *Gilly-Flowers*, *Pinkes*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cauſe* whereof is, for that the *Sap* aſcendeth vnequally, and doth (as it were) tire and ſtop by the way. And it ſeemeth, they haue ſome *Cloſeneſſe* and *Hardneſſe* in their *Stalke*, which hindereth the *Sap* from going vp, vntill it hath gathered into a Knot, and ſo is more vrged to put forth. And therefore, they are moſt of them hollow, when the *Stalke* is drie. As *Fennell-Stalke*, *Stubble*, and *Canes*.

590 *Flowers* haue (all exquiſite *Figures*; And the *Flower-Numbers*, are (chiefly) *Fiue*, and *Foure*; As in *Prime-Roſes*, *Brier-Roſes*, *Single-Muſk-Roſes*, *Single-Pinkes*, *and Gilly-Flowers*, &c. which haue fiue *Leaues*: *Lillies*, *Flower-de-Luces*, *Borage*, *Bugloſſe*, &c. which haue foure Leaues. But ſome put forth *Leaues* not Numbred; But they are euer ſmall Ones; As *Mary-Golds*, *Trifoile*, &c. Wee ſee alſo, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the Fiue *Brethren* of the *Roſe*; *Sockets* of *Gilly-Flowers*, &c. *Leaues* alſo are all *Figured*; Some Round, Some Long; None Square; And many iagged on the Sides; Which *Leaues* of *Flowers* ſeldome are. For I account the *Iagging* of *Ginkes*, and *Gilly-Flowers*, to be like the Inequality of *Oake-Leaues*, or *Vine-Leaues*, or the like; But they ſeldome or neuer haue any ſmall *Gurles*.

Experiments in Conſort touching ſome Principall Differences in Plants.

591 OF *Plants*, ſome few put forth their *Bloſſomes* before their *Leaues*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But moſt put forth ſome *Leaues* before their *Bloſſomes*; As *Apples*, *Peares*, *Plums*, *Cherries*, *White-Thorne*, &c. The *Cauſe* is, for that thoſe, that put forth their *Bloſſomes* firſt, haue either an Acute and *Sharpe Spirit*; (And therefore commonly they all put forth early in the Spring; and ripen very late; As moſt of the Particulars before mentioned;) Or elſe an *Oyly Iuyce*, which is apter to put out *Flowers*, than *Leaues*.

592 Of *Plants*, ſome are *Greene* all *winter*; Others caſt their *Leaues*. There are *Greene* all *winter*, *Holly*, *Iuy*, *Box*, *Firre*, *Eugh*, *Cypreſſe*, *Iuniper*, *Bayes*, *Roſe-Mary*, &c. The *Cauſe* of the Holding *Greene*, is the Cloſe and Compact *Subſtance* of their *Leaues*, and the *Pedicles* of them. And the *Cauſe* of that againe, is either the *Tough*, and *Viſcous Iuice* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the firſt Sort is *Holly*; Which is of ſo *Viſcous* a *Iuyce*, as they make *Bird-lime* of the *Barke* of it. The *Stalke* of *Iuy* is Tough and not Fragile, as we ſee in other ſmall Twigs dry. *Firre* yeeldeth *Pitch*. *Box* is a faſt and heauy *Wood*, as we ſee it in *Bowles*. *Eugh* is a Strong and Tough *Wood*, as we ſee it in *Bowes*. Of the ſecond Sort is *Iuniper*, which is a *Wood* Odorate, and maketh a hot Fire. *Bayes* is likewiſe a Hot and Aromaticall *Wood*; And ſo is *Roſe-Mary* for a *Shrub*. As for the *Leaues*, their Denſity appeareth, in that, either they are Smooth

and

and Shining, as in *Bayes*, *Holly*, *Box*, &c. Or in that they are Hard and Spiry, as in the reſt. And Tryall would be made of *Grafting* of *Roſe-Mary*, and *Bayes*, and *Box*, vpon a *Holly-Stocke*; Becauſe they are *Plants* that come all *Winter*. It were good to trie it alſo with *Grafts* of other *Trees*, either *Fruit Trees*, or *Wilde Trees*; to ſee whether they will not yeeld their *Fruit*, or beare their *Leaues*, later, and longer in the *Winter*; becauſe the *Sap* of the *Holly* putteth forth moſt in the *Winter*. It may be alſo a *Mezerion-Tree*, grafted vpon a *Holly*, will proue both an Earlier, and a Greater *Tree*.

There be ſome *Plants*, that beare no *Flowers*, and yet beare *Fruit*: There be ſome, that beare *Flowers*, and no *Fruit*. There be ſome that beare neither *Flowers*, nor *Fruit*. Moſt of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewiſe) of the *Fruit-Trees*; As *Mulberry*, *Wall-nut*, &c. And *Shrubs*, (as *Iuniper*, *Holly*, &c.) beare no *Flowers*. Diuers *Herbs* alſo beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*: As *Purſlane*, &c. Thoſe that beare *Flowers* and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by Art, or Culture; For if it be by Art, then Triall would be made, whether *Apples*, and other *Fruits Bloſſomes*, may not be doubled. There are ſome Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c. 593

There be ſome *Plants*, that ſhoot ſtill vpwards, and can *Support* themſelues; As the greateſt Part of *Trees* and *Plants*: there bee ſome Other, that *Creepe* along the *Ground*: Or *Winde* about other *Trees*, or *Props*, and cannot ſupport themſelues; As *Vines*, *Iuy*, *Briar*, *Briony*, *Woodbines*, *Hops*, *Climatis*, *Camomill*, &c. The *Cauſe* is, (as hath beene partly touched,) for that all *Plants* (naturally) moue vpwards; But if the *Sap* put vp too faſt, it maketh a ſlender *Stalke*, which will not ſupport the weight: And therefore theſe latter Sort are all Swift and Haſty Commers. 594

Experiments in Conſort touching all Manner of *Compoſts*, and *Helps* of *Ground*.

THe firſt and moſt Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the beſt; And next, the *Dung* of *Kine*: And thirdly, that of *Horſes*: Which is held to be ſomewhat too hot, vnleſſe it be mingled. That of *Pigeons* for a Garden, or a ſmall Quantity of Ground excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to ſpread it immediatly before the *Plowing* and *Sowing*, And to to *Plow* it in: For if you ſpread it long before, the *Sunne* will draw out much of the *Fatneſſe* of the *Dung*: If the *Ground* be *Grazing Ground*, to ſpread it ſomewhat late, towards *winter*; that the *Sunne* may haue the leſſe Power to drie it vp. As for ſpeciall *Compoſts* for *Gardens*, (as a *Hot Bed*, &c.) wee haue handled them before. 595

The Second *Kind* of *Compoſt*, is, the *Spreading* of diuers *Kinds* of *Earths* As *Marle*, *Chalke*, *Sea-Sand*, *Earth* vpon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the beſt; As hauing moſt Fatneſſe; 596

And

And not Heating the *Ground* too much. The next *Sea Sand*, Which (no doubt) obtaineth a ſpeciall Vertue, by the *Salt*: For *Salt* is the firſt Rudiment of life. *Chalke* ouer-heateth the *Ground* a little. And therefore is beſt vpon *Gold Clay-Grounds*, or *Moiſt Grounds*: But I heard a great *Husband* ſay, that it was a common Errour to think that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Graſſe*, as well as *Corne*: But that which breedeth the Errour is, becauſe after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Reſt; And then (indeed) afterward it will beare little *Graſſe*, becauſe the *Ground* is tired out. It were good to trie the laying of *Chalke* vpon *Arable Grounds*, a little while before *Plowing*; And to *Plow* it in, as they doe the *Dung*; But then it muſt be Friable firſt, by Raine, or Lying: As for *Earth*, it *Compaſſeth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred vpon it; and it did beare *Fruit* excellently the firſt veare of the Planting: For the *Surface* of the *Earth* is euer the Fruitfulleſt. And *Earth* ſo prepared hath a double *Surface*. But it is true, as I conceiue, that ſuch *Earth*, as hath *Salt Petre* bred in it, if you can procure it without too much charge, doth excell. The way to haſten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore if you make a large Houell, thatched, ouer ſome Quantity of Ground; Nay if you doe but Plancke the Ground ouer, it will breed *Salt-Petre*. As for *Pond Earth*, or *Riuer Earth*, it is a very good *Compoſt*; Eſpecially if the *Pond* haue beene long vncleanſed, and ſo the *Water* bee not too Hungry: And I Iudge it will be yet better, if there be ſome *Mixture* of *Chalke*.

597 The Third *Helpe* of *Ground*, is, by ſome other *Subſtances*, that haue a Vertue to make *Ground* Fertile, though they bee not meerely *Earth*: wherein *Aſhes* Excell; In ſo much as the Countries about *Ætna*, and *Veſuuius*, haue a kinde of Amends made them, for the Miſchiefe the Eruptions (many times) doe, by the exceeding *Fruitfulneſſe* of the *Soyle*, cauſed by the *Aſhes*, ſcattered about. *Soot* alſo, though thin ſpred, in a *Field*, or *Garden*, is tried to bee a very good *Compoſt*. For *Salt*, it is too Coſtly: But it is tried, that mingled with *Seed-Corne*, and ſowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all ouer. As for the *Steeping* of the *Seeds*, in ſeuerall *Mixtures* with *Water*, to giue them Vigour; Or *Watring Grounds* with *Compoſt-Water*; We haue ſpoken of them before.

598 The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables to die into the Ground*; And ſo to Fatten it; As the *Stubble* of *Corne*, Eſpecially *Peaſe Brakes* caſt vpon the *Ground*, in the Beginning of *Winter*, will make it very Fruitfull. It were good (alſo) to try, whether *Leaues* of *Trees* ſwept together with ſome *Chalke* and *Dung* mixed, to giue them more Heart, would not make a good *Compoſt*: For there is nothing loſt, ſo much as *Leaues* of *Trees*; And as they lye ſcattered, and without Mixture, they rather make the *Ground* ſoure, than otherwiſe.

The

The Fifth *Helpe* of *Ground*, is *Heat* and *warmth*. It hath beene anciently practiſed to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, vpon the *Ground*: We ſee, that *warmth* of *Wals* and *Encloſures*, mendeth *Ground*: We ſee alſo that *Lying open* to the *South*, mendeth *Ground*: We ſee againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *warmth*, as by their *Compoſt*: And it may be doubted, whether the *Couering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof we ſpake in the laſt *Experiment*,) helpeth it not, by reaſon of the *warmth*. Nay ſome very good *Husbands* doe ſuſpect, that the *Gathering* vp of *Flints*, in *Flinty Ground*, and laying them on *Heapes*, (which is much vſed,) is no good *Husbandry*; For that they would keepe the *Ground* Warme. 599

The Sixth *Helpe* of *Ground* is, by *watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *waters*, at ſeaſonable Times: For *water* at ſome Seaſons, and with too long ſtay, doth good; But at ſome other Seaſons, and with reaſonable Stay, doth hurt. And this ſerueth only for *Meadowes*, which are along ſome *Riuer*. The other way is, to bring *water* from ſome *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in ſome long *Furrowes*; And from thoſe *Furrowes*, drawing it trauerſe to ſpread the *water*. And this maketh an excellent Improuement, both for *Corne* and *Graſſe*. It is the richer, if thoſe *Hanging Grounds* be fruitfull, becauſe it waſheth off ſome of the Fatneſſe of the *Earth*: But howſoeuer it profiteth much. Generally, where there are great Ouerflowes, in *Fens*, or the like, the drowning of them in the *winter*, maketh the *Summer* following more fruitfull: The *Cauſe* may be, for that it keepeth the *Ground* warme, and nouriſheth it: But the *Fen-Men* hold, that the *Sewers* muſt be kept ſo, as the *water* may not ſtay too long in the *Spring*, till the *weeds* and *Sedge* be growne vp; For then the *Ground* will be like a Wood, which keepeth out the Sunne; And ſo continueth the Wet; Whereby it will neuer graze (to purpoſe) that yeare. Thus much for *Irrigation*. But for *Auoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, we ſhall ſpeake of them in another Place. 600

NATV-

NATVRALL HISTORIE.

VII. Century.

THe *Differences* betweene *Animate* and *Inanimate Bodies*, we ſhall handle fully vnder the *Title* of *Life*, and *Liuing Spirits*, and *Powers*. We ſhall therefore make but a brieſe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* haue *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* betweene *Animate* and *Inanimate*, are two: The firſt is, that the *Spirits* of *Things Animate*, are all *Continued* with themſelues, and are *Branched* in *Veines*, and ſecret *Canales*, as *Bloud* is: And in *Liuing Creatures*, the *Spirits* haue not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reſide; and whereunto the reſt doe reſort: But the *Spirits* in things *Inanimate* are ſhut in, and cut off by the *Tangible Parts*; And are not pertious one to another; As *Aire* is in *Snow*. The Second Maine *Difference* is, that the *Spirits* of *Animate Bodies*, are all in ſome degree, (more or leſſe,) kindled and inflamed; And haue a fine *Commixture* of *Flame*, and an *Aëriall Subſtance*. But *Inanimate Bodies* haue their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* conſiſteth not in the *Heat* or *Coleneſſe* of *Spirits*; For *Cloues* and other *Spices*, *Naphtha* and *Petroleum*, haue exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of thoſe Weake and Temperate *Bodies* come to

Experiments in Conſort touching the *Affinities*, and *Differences*, betweene *Plants* and *Inanimate Bodies*.

601

to be Inflamed, then they gather a much greater *Heat*, than others haue *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

602 The *Differences*, which are *Secundary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They haue an *Accretion*, but no *Alimentation*. Thirdly, *Plants* haue a *Period* of *Life*; which *Inanimate Bodies* haue not. Fourthly, they haue a *Succession*, and *Propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

603 The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold Inanimate,) are these: First, *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part aboue *Earth*, and part vnder *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Neareſt of both *Kindes*: Another is *Vitriol*, for that is apteſt to ſprout with *Moiſture*.

605 Another ſpeciall *Affinity* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it diſſolue it not in *Arefaction*) will in the end iſſue into *Plants*, or *Liuing Creatures* bred of *Putrefaction*. I account *Moſſe*, and *Muſhromes*, and *Agaricke*, and other of thoſe kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Fleſh*, and *Fiſh*, and *Plants* themſelues, and a number of other things, after a *Mouldineſſe*, or *Rottennеſſe*, or *Corrupting*, they will fall to breed *Wormes*. Theſe *Putrefactions*, which haue *Affinity* with *Plants*, haue this *Difference* from them; That they haue no *Succeſſion* or *Propagation*, though they *Nouriſh*, and haue a *Period* of *Life*, and haue likewiſe ſome *Figure*.

606 I left once, by chance, a *Citron* cut, in a cloſe Roome, for three Summer-Moneths, that I was abſent; And at my Returne, there were growne forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would haue beene ſome *Herbe*.

Experiments in Conſort, touching the *Affinities*, and *Differences*, of *Plants*, and *Liuing Creatures*: And the *conſiners* and *Participles* of them.

607 THe *Affinities* and *Differences* betweene *Plants* and *Liuing Creatures*, are theſe that follow. They haue both of them *Spirits Contined*, and *Branched*, and alſo *Inflamed*: But firſt in *Liuing Creatures*, the *Spirits* haue a *Cell* or *Seat*, which *Plants* haue not; As was alſo formerly ſaid: And ſecondly, the *Spirits* of Liuing *Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And theſe two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. Firſt, *Plants* are all *Fixed* to the *Earth*; Whereas all *Liuing Creatures* are ſeuered, and of themſelues. Secondly, *Liuing Creatures* haue *Locall Motion*; *Plants* haue not. Thirdly, *Liuing Creatures* nouriſh from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nouriſh from below, namely from the *Roots*. Fourthly, *Plants* haue their *Seed* and *Seminall Parts* vppermoſt; *Liuing Creatures* haue

haue them lower-moſt: And therefore it was ſaid, not elegantly alone, but Philoſophically; *Homo eſt Planta inuerſa*; *Man is like a Plant turned vpwards:* For the *Root* in *Plants*, is as the *Head* in *Liuing Creatures*. Fifthly, *Liuing Creatures* haue a more exact *Figure* than *Plants*. Sixthly, *Liuing Creatures* haue more *Diuerſity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* haue. Seuenthly, *Liuing Creatures* haue *Senſe*, which *Plants* haue not. Eighthly, *Liuing Creatures* haue *Voluntary Motion*, which *Plants* haue not.

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name diſtinguiſhed; As *Male-Piony*, *Female-Piony*; *Male-Roſe-mary*, *Female-Roſe-mary*; *He-Holly*, *She-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neereſt approach of it, is betweene the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neere, incline the One to the other: In ſo much as, (that which is more ſtrange) they doubt not to report, that to keepe the *Trees* vpright from Bending, they tie *Ropes* or *Linnes*, from the one to the other, that the *Contact* might be enioyed by the *Contact* of a *Middle Body*. But this may be Faigned, or at leaſt Amplified. Neuertheleſſe, I am apt enough to thinke, that this ſame *Binarium* of a Stronger and a Weaker, like vnto *Maſculine* and *Feminine*, doth hold in all *Liuing Bodies*. It is confounded ſometimes; As in ſome *Creatures* of *Putrifaction*, wherein no *Markes* of *Diſtinction* appeare: And it is doubled ſometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in moſt *Species*. 608

The *Participles* or *Confiners* betweene *Plants* and *Liuing Creatures*, are ſuch chiefly, as are *Fixed*, and haue no *Locall Motion* of *Remoue*, though they haue a *Motion* in their *Parts*; Such as are *Oyſters*, *Cockles*, and ſuch like. There is a Fabulous Narration, that in the *Northerne Countries*, there ſhould be an *Herbe* that groweth in the likeneſſe of a *Lambe*, and feedeth vpon the *Graſſe*, in ſuch ſort, as it will bare the *Graſſe* round about. But I ſuppoſe that the *Figure* maketh the *Fable*; For ſo we ſee, there be *Bee Flowers*, &c. And as for the *Graſſe*, it ſeemeth the *Plant*, hauing a great *Stalke* and *Top*, doth prey vpon the *Graſſe*, a good way about, by drawing the *Iuyce* of the *Earth* from it. 609

Experiments *Promiſcuous* touching *Plants*.

THe *Indian Fig* boweth his *Roots* downe ſo low, in one yeare, as of it ſelfe it taketh *Root* againe: And ſo multiplieth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cauſe* is the *Plenty* of the *Sap*, and the *Softneſſe* of the *Stalke*, which maketh the *Bough*, being ouerloaden, and not ſtiffely vpheld, weigh downe. It hath *Leaues*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cauſe* is, for that the continuall Shade increaſeth the *Leaues*, and abateth the *Fruit*; which neuertheleſſe is of a pleaſant Taſte. And that (no doubt) is cauſed, by the *Suppleneſſe* and *Gentleneſſe* of the Iuyce of that *Plant*, being that which maketh the *Boughes* alſo ſo Flexible. 610

It is reported by one of the *Ancients*, that there is a certaine *Indian* 611

Tree, hauing few, but very great, *Leaues*, three Cubits long, and two broad; And that the *Fruit*, being of good Taſte, groweth out of the *Barke*. It may be, there be *Plants*, that powre out the *Sap* ſo faſt, as they haue no leaſure, either to diuide into many *Leaues*, or to put forth *Stalks* to the *Fruit*. With vs, *Trees* (generally) haue ſmall *Leaues*, in compariſon. The *Fig* hath the greateſt; And next is the *Vine*, *Mulberry*, and *Sycamore*; And the Leaſt, are thoſe of the *willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaues* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The *Cauſe* is, (like to that of the *Indian Fig*,) the haſty and plentifull Putting forth of the *Sap*.

612 There be three things in vſe for *Sweetneſſe*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was ſcarce knowne, and little vſed. It is found in *Canes*: *Quere*, whether to the firſt *Knuckle*, or further vp? And whether the very *Bark* of the *Cane* it ſelfe do yeeld *Sugar* or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I haue heard from one, that was induſtrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that he hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a forthnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported alſo by ſome of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleyes of *Hyrcania*, that diſtilleth *Honey* in the *Mornings*. It is not vnlike, that the *Sap* and *Teares* of ſome *Trees*, may be ſweet. It may be alſo, that ſome ſweet Iuyces, fit for many vſes, may be concocted out of *Fruits*, to the Thickneſſe of *Honey*; or perhaps of *Sugar*; The likelieſt are *Raiſins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired.

613 The *Ancients* report of a *Tree*, by the *Perſian Sea*, vpon the *Shore-Sands*, which is nouriſhed with the *Sale-Water*; And when the *Tide* ebbeth, you ſhall ſee the *Roots*, as it were bare without *Barke*, (being as it ſeemeth corroded by the *Salt*,) and graſping the *Sands* like a *Crab*; Which neuertheleſſe beareth a *Fruit*. It were good to try ſome *Hard Trees*, as a *Seruice-Tree*, or *Fir-Tree*, by ſetting them within the *Sands*.

614 There be of *Plants*, which they vſe for *Garments*, theſe that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make alſo *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter commonly; And ſometimes the *Downe* that groweth aboue.

615 They haue in ſome *Countries* a *Plant* of a *Roſie Colour*, which ſhutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of thoſe *Countries* ſay is a *Plant* that *Sleepeth*. There be *Sleepers* enow then; For almoſt all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that haue a *Moſſy* or *Downy Root*; And likewiſe that haue a number of *Threds*, like *Beards*; As *Mandrakes*; whereof *witches* and *Impoſtours* make an vgly *Image*, giuing it the Forme of a *Face* at the *Top* of the *Root*, and leaue thoſe *Strings* to make a broad *Beard* downe to the Foot. Alſo there is a Kinde of *Nard* in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Dones* foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And I take it in the *Bulbous*, the Sap haſteneth moſt to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That beſides the Putting forth vpwards, and downwards, putteth forth in Round.

617 There are ſome *Teares* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, eſpecially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth vpon their *Beards*: Of this Sort is ſome kinde of *Ladanum*.

618 The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewiſe with *Roots*; For vpon *Seeds* it worketh no great Effects.

619 The way to carry *Forraine Roots*, a long Way, is to veſſell them cloſe in *Earthen Veſſels*. But if the *Veſſels* bee not very Great, you muſt make ſome Holes in the Bottome, to giue ſome refreſhment to the *Roots*; Which otherwiſe (as it ſeemeth) will decay, and ſuffocate.

620 The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryeſt; And thoſe Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it proſpered worſt: It grew alſo amongſt *Buſhes* of other kindes, where commonly *Plants* doe not thriue: Neither did it loue the Sunne: There might be one *Cauſe* of all thoſe Effects; Namely, the ſparing Nouriſhment, which that *Plant* required. *Quære* how farre *Caſſia*, which is now the Subſtitute of *Cinnamon*, doth participate of theſe Things.

621 It is reported by one of the *Ancients*, that *Caſſia*, when it is gathered, is put into the *Skins* of *Beaſts*, newly fleyed; And that the *Skin*, Corrupting, and Breeding *Wormes*, the *Wormes* doe deuoure the *Pith* and *Marrow* of it, and ſo make it Hollow; But meddle not with the *Barke*, becauſe to them it is bitter.

622 There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than we know any; For there haue beene *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde Vines*; For the *Vines*, that they vſe for *Wine*, are ſo often Cut, and ſo much Digged and Dreſſed, that their *Sap* ſpendeth into the *Grapes*, and ſo the *Stalke* cannot increaſe much in *Bulke*. The *Wood* of *Vines* is very durable; without *Rotting*. And that which is ſtrange, though no *Tree* hath the *Twigs*, while they are greene, ſo brittle, yet the *Wood* dried is extreme Tough; And was vſed by the *Captaines* of *Armies*, amongſt the *Romans*, for their *Cudgels*.

623 It is reported, that in ſome Places, *Vines* are ſuffered to grow like *Herbs*, ſpreading vpon the *Ground*; And that the *Grapes* of thoſe *Vines* are very great. It were good to make triall, whether *Plants* that vſe to be borne vp by Props, will not put forth greater *Leaues*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c.

624 *Quinces*, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But becauſe *Honey* (perhaps) will giue them a Taſte Ouer-

luſhious, it were good to make Triall in *Powder* of *Sugar*: Or in *Syrrup* of *Wine*, onely Boyled to Height. Both theſe would likewiſe be tried in *Orenges*, *Limons*, and *Pomgranats*; For the *Powder* of *Sugar*; and *Syrrup* of *Wine*, will ſerue for more times than once.

625 The *Conſeruation* of *Fruit* would be alſo tried in *Veſſels*, filled with *fine Sand*, or with *Powder* of *Chalke*; Or in *Meale* and *Flower*; Or in *Duſt* of *Oake-wood*; Or in *Mill*.

626 Such *Fruits*, as you appoint for *Long Keeping*, you muſt gather before they be full *Ripe*; And in a *Faire* and *Dry Day*, towards *Noone*; And when the *Wind* bloweth not *South*; And when the *Moone* is vnder the *Earth*; And in *Decreaſe*.

627 Take *Grapes*, and hang them in an *Empty Veſſell*, well Stopped; And ſet the *Veſſell*, not in a *Cellar*, but in ſome dry *Place*; And it is ſaid, they will laſt long. But it is reported by ſome, they will keepe better, in a *Veſſell* halfe full of *Wine*, ſo that the *Grapes* touch not the *wine*.

628 It is reported, that the *Preſerving* of the *Stalke*, helpeth to preſerue the *Grape*; Eſpecially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

629 It is reported by ſome of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* vnder *Water*, will keepe long.

630 Of *Herbs* and *Plants*, ſome are good to eat Raw; As *Lettuce*, *Endiue*, *Purſlane*, *Tarragon*, *Creſſes*, *Cucumbers*, *Muſk-Melons*, *Raddiſh*, &c. Others onely after they are *Boyled*, or haue *Paſſed the Fire*; As *Parſley*, *Clary*, *Sage*, *Parſnips*, *Turnips*, *Aſparagus*, *Artichoakes*, (though they alſo being young are eaten *Raw*:) But a Number of *Herbs*, are not *Eſculent* at all; As *Worme-Wood*, *Graſſe*, *Greene-Corne*, *Centory*, *Hyſſope*, *Lauender*, *Balme*, &c. The *Cauſes* are, for that the *Herbs*, that are not *Eſculent*, doe want the two *Taſtes*, in which *Nouriſhment* reſteth; Which are, *Fat*, and *Sweet*; And haue (contrariwiſe) *Bitter* and *Ouer-ſtrong Taſtes*, or a *Iuyce* ſo Crude, as cannot be ripened to the degree of *Nouriſhment*. *Herbs* and *Plants*, that are *Eſculent Raw*, haue *Fatneſſe*, or *Sweetneſſe*, (as all Eſculent *Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it muſt bee ſuch a *Fatneſſe*, (for as for *Sweet Things*, they are in effect alwaies *Eſculent*) as is not Ouer-groſſe, and Loading of the *Stomach*, For *Pparſnips* and *Leeks* haue *Fatneſſe*; But it is too Groſſe and Heauy without *Boyling*. It muſt be alſo in a Subſtance ſomewhat Tender; For we ſee *Wheat*, *Barley*, *Artichoakes*, are no good *Nouriſhment*, till they haue Paſſed the *Fire*; But the *Fire* doth ripen, and maketh them ſoft and tender, and ſo they become *Eſculent*. As for *Radiſh* and *Tarragon*, and the like, they are for *Condiments*, and not for *Nouriſhment*. And euen ſome of thoſe *Herbs*, which are not *Eſculent*, are notwithſtanding *Peculent*; As *Hops*, *Broome*, &c. *Quare* what *Herbs* are good for *Drinke*, beſides the two aforenamed; For that it may (perhaps) eaſe the Charge of *Brewing*, if they make *Beere* to require leſſe *Malt*, or make it laſt longer.

631 *Parts* fit for the *Nouriſhment* of *Man*, in *Plants*, are *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaues*, they giue no *Nouriſhment*,

ment, at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *watry Substance* commixed,) haue more of the *Oily Substance*; And *Leaues*, *Flowers*, &c. of the *watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth euer in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (wee see) are halfe a yeere, or more, in *Concocting*; Whereas *Leaues* are out, and Perfect in a Monerh.

632 *Plants* (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The *Cause* is, for that in *Plants*, that are not of a Fierce and Eager *Spirit*, the Vertue is increased by *Concoction*, and *Maturation*, which is euer most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilest the *Spirit* is enclosed in the *Root*; And the *Spirits* doe but weaken and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlick*, *Dragon*, &c. Nay there be *Plants*, that haue their *Roots*, very *Hot*, and *Aromaticall*; And their *Seeds*, rather *Insipide*; As *Ginger*. The *Cause* is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which vnder the *Earth* is contained and held in, But when it commeth to the *Aire*, it exhaleth.

633 The *Iuyces* of *Fruits* are either *Watry*, or *Oily*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in vse for *Drinke*, yet they appeare to be of the same *Nature*; As *Plummes*, *Seruices*, *Mulberries*, *Rasps*, *Orenges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaq; admistis imitantur vitea Sorbis.

And it may bee *Heps* and *Brier Berries* would doe the like. Those that haue *Oily Iuyce*, are; *Oliues*, *Almonds*, *Nuts* of all sorts, *Pine Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must obserue also, that some of the *watry Iuyces*, after they haue gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kind of *Fruit*, that is sweet, without either *Sharpnesse* or *Oylinesse*: Such as is the *Fig*, and the *Date*.

634 It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeeres. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare diuers yeers together.

635 There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are Inflammable; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The *Cause* of all these may be, the *Closenesse* and *Solidnesse* of the *Wood*, and *Pith* of the *Oake*; Which maketh seuerall *Iuyces* finde seuerall *Eruptions*. And therefore,

if you will deuiſe to make any *Super-Plants*, you muſt euer giue the *Sap* Plentifull Riſing, and hard Iſſue.

636 There are two *Excreſcences* which grow vpon *Trees*; Both of them in the Nature of *Muſhromes*: The one the *Romans* called *Boletus*; Which groweth vpon the *Roots* of *Oakes*; and was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we haue ſpoken before) which groweth vpon the Tops of *Oakes*; Though it be affirmed by ſome, that it groweth alſo at the *Roots*. I doe conceiue, that many *Excreſcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into ſome *Preternaturall Subſtance*.

637 The greater part of *Trees* beare *Moſt*, and *Beſt*, on the *Lower Boughes*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But ſome beare *Beſt* on the *Top-Boughes*; As *Crabs*, &c. Thoſe that beare beſt below, are ſuch, as Shade doth more good to, than Hurt. For generally all *Fruits* beare beſt loweſt; Becauſe the *Sap* tireth not, hauing but a ſhort Way: And therefore in *Fruits* ſpred vpon *walls*, the Loweſt are the Greateſt, as was formerly ſaid; So it is the *Shade* that hindereth the *Lower Boughes*; Except it be in ſuch *Trees*, as delight in *Shade*; Or at leaſt beare it well. And therefore, they are either Strong *Trees*, as the *Oake*; Or elſe they haue large *Leaues*, as the *Wallnut* and *Fig*; Or elſe they grow in *Pyramis*, as the *Peare*. But if they require very much *Sunne*, they beare beſt on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c.

638 There be *Trees* that beare beſt when they begin to bee *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that giue *Maſt*. The *Cauſe* is, for that all *Trees* that beare *Maſt* haue an *Oyly Fruit*; And *Young Trees* haue a more *Watry Iuyce*, and leſſe Concocted; And of the ſame kinde alſo is the *Almond*. The *Peare* likewiſe, though it be not *Oyly*, yet it requireth much *Sap*, and well Concocted; For we ſee it is a Heauy *Fruit*, and Solid; Much more than *Apples*, *Plummes*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *wine*, when it is *Old*; For that the *Iuyce* is better Concocted: And wee ſee that *Wine* is Inflammable; So as it hath a kinde of *Oylineſſe*. But the moſt Part of *Trees*, amongſt which are *Apples*, *Plummes*, &c. beare beſt when they are *Young*.

639 There be *Plants*, that haue a *Milke* in them, when they are Cut; As *Figs*, *Old Lettuce*, *Sow-Thiſtles*, *Spurge*, &c. The *Cauſe* may be an *Inception* of *Putrefaction*; For thoſe *Milkes* haue all an *Acrimony*; though one would thinke they ſhould be *Lenitiue*. For if you write vpon Paper, with the *Milke* of the *Fig*, the Letters will not be ſeene, vntill you hold the Paper before the Fire, and then they wax Browne; Which ſheweth that it is a Sharpe or Fretting *Iuyce*: *Lettuce* is thought Poyſonous, when it is ſo *Old*, as to haue *Milke*; *Spurge* is a kinde of Poyſon in it Selfe; And as for *Sow-Thiſtles*, though Coneyes eat them, yet Sheepe and Cattell will not touch them; And beſides the *Milke* of them, rubbed vpon Warts, in ſhort time, weareth them away: Which ſheweth the *Milke*

of

of them to be *Corosiue*. We see also, that *wheat*, and other *Corne sowen*, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is euer a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushromes are reported to grow, as well vpon the *Bodies* of *Trees*, as vpon their *Roots*, or vpon the *Earth*: And especially vpon the *Oake*. The *Cause* is, for that Strong *Trees*, are towards such *Excrescences*, in the Nature of *Earth*; And therefore Put forth *Mosse*, *Mushromes*, and the like. 640

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Soquotra*: The *Herbe Amaranthus* (indeed,) is *Red* all ouer; And *Brasill* is *Red* in the *wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee see that *Grapes* and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*, Because the *Iuyce* hasteneth not vp; And besides it is very *Astringent*; And therefore of Slow Motion. 641

It is reported, that *Sweet Mosse*, besides that vpon the *Apple-Trees*, groweth likewise (sometimes) vpon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Barke*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also Sweet, and sparkleth in the Burning. *Quære* of the *Mosses* of *Odorate Trees*, As *Cedar*, *Cypres*, *Lignum Aloës*, &c. 642

The *Death* that is most without Paine, hath beene noted to be, vpon the *Taking* of the *Potion* of *Hemlock*; which inhumanity was the Forme of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* vsed, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the Strife of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*, Like to the *Death* of an extreme Old Man. I conceiue it is a lesse Painfull than *Opium*, because *Opium* hath Parts of *Heat* mixed. 643

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicie. And some neuer *Ripen* to be *Sweet*; As *Tamarinds*, *Berberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde haue much and subtill *Heat*, which causeth Early Sweetnesse; The latter haue a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet*, and yet *Astringent*. 644

There be few *Herbs* that haue a *Salt Taste*; And contrariwise all *Bloud* of *Liuing Creatures* hath a *Saltnesse*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the Originall *Taste* remaineth 645

remaineth not; For you ſhall haue them *Bitter*, *Sowre*, *Sweet*, *Biting*, but ſeldome *Salt*: But in *Liuing Creatures*, all thoſe High *Taſtes* may happen to be (ſometimes) in the *Humours*, but are ſeldome in the *Fleſh*, or *Subſtance*; Becauſe it is of a more *Oily Nature*; which is not very Suſceptible of thoſe *Taſtes*; And the *Saltneſſe* it ſelfe of *Blood*, is but a light, and ſecret *Saltneſſe*: And euen among *Plants*, ſome doe participate of *Saltneſſe*, as *Alga Marina*, *Sampire*, *Scurvy-Graſſe*, &c. And they report, there is, in ſome of the *Indian-Seas*, a *Swimming Plant*, which they call *Salgazus*, ſpreading ouer the *Sea*; in ſuch ſort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Aſhes* of all *Plants*, they extract a *Salt*, which they vſe in *Medicines*.

646 It is reported by one of the *Ancients*, that there is an *Herb* growing in the *water*, called *Lincoſtis*, which is full of *Prickles*: This *Herbe* putteth forth another ſmall *Herbe* out of the *Leafe*; which is imputed to ſome *Moiſture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember alſo I haue ſeene, for a great Rarity, one *Roſe* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top gallants*.

647 *Barley*, (as appeareth in the *Malting*,) being ſteeped in *water* three dayes, and afterwards the *water* drained from it, and the *Barley* turned vpon a drie floare, will ſprout, halfe an Inch long at leaſt: And if it bee let alone, and not turned, much more; vntill the Heart be out. *Wheat* will doe the ſame. Try it alſo with *Peaſe*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Viue*; For there it is of the old Store, for no *water* is added; But here it is nouriſhed from the *Water*. The *Experiment* would be further driuen; For it appeareth already, by that which hath been ſaid, that *Earth* is not neceſſary to the firſt Sprouting of *Plants*; And we ſee that *Roſe-Buds* ſet in *Water*, will Blow; Therefore try whether the *Sprouts* of ſuch *Graines* may not be raiſed to a further Degree: As to an *Herbe*, or *Flower*, with *Water* only; Or ſome ſmall Commixture, of *Earth*: For if they will, it ſhould ſeeme by the *Experiments* before, both of the *Malt*, and of the *Roſes*, that they will come far faſter on in *Water*, than in *Earth*: For the *Nouriſhment* is eaſilier drawne out of *Water*, than out of *Earth*. It may giue ſome light alſo, that *Drinke* infuſed with *Fleſh*, as that with the C[illegible]n, &c. wil nouriſh faſter and eaſilier, than *Meat* and *Drinke* together. Try the ſame *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and ſteepe it a while, and then dry it, and ſee whether it will ſprout.

684 *Malt* in the *Drenching* will ſwell; And that in ſuch a manner, as after the Putting forth in ſprouts, and the drying vpon the Keele, there will be gained at leaſt a Buſhell in eight, and yet the Sprouts are rubbed off; And there will be a Buſhell of *Duſt* beſides the *Malt*: Which I ſuppoſe to be, not only by the looſe, and open Laying of the *Parts*, but by ſome Addition of *Subſtance*, drawne from the *Water*, in which it was ſteeped.

649 *Malt* getheretha *Sweetneſſe* to the *Taſte*, which appeareth yet more

in

in the *Wort*. The *Dulcoration* of *Things* is worthy to be tryed to the full; For that *Dulcoration* importeth a degree to *Nouriſhment*: And the Making of *Things Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

650 Moſt *Seeds* in the Growing, leaue their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The *Cauſe* may be, for that the *Skin* or *Huske* is not eaſie to breake; As we ſee by the Pilling of *Onions*, what a Holding *Subſtance* the *Skin* is.

651 *Plants*, that haue *Curled Leaues*, doe all abound with *Moiſture*; Which commeth ſo faſt on, as they cannot ſpread themſelues Plaine, but muſt needs gather together: The Weakeſt Kind of *Curling* is *Roughneſſe*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne and *Cabbage-Lettuce*.

652 It is reported, that *Firre*, and *Pine*, eſpecially if they be *Old* and *Putrified*, though they ſhine not, as ſome *Rotten Woods* doe, yet in the ſudden *Breaking* they will ſparkle like Hard *Sugar*.

653 The *Roots* of *Trees* doe (ſome of them,) put downewards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some ſpread more towards the *Surface* of the *Earth*, As the *Aſh*, *Cypreſſe-Tree*, *Oliue*, &c. The *Cauſe* of this latter may be, for that ſuch *Trees* as loue the *Sunne*, doe not willingly deſcend farre into the *Earth*; And therefore thy are (commonly) *Trees*, that ſhoot vp much; For in their *Body*, their deſire of Approach to the *Sunne*, maketh them ſpread the leſſe. And the ſame Reaſon vnder *Ground*, to auoid Receſſe from the *Sunne*, maketh them ſpread the more. And we ſee it commeth to paſſe in ſome *Trees*, which haue beene planted too deep in the *Ground*, that for loue of Approach to the *Sunne*, they forſake their firſt *Root*, and put out another more towards the *Top* of the *Earth*. And wee ſee alſo, that the *Oliue* is full of *Oily Iuyce*; And *Aſh* maketh the beſt Fire; And *Cypreſſe* is an *Hot Tree*. As for the *Oake*, which is of the former ſort, it loueth the *Earth*; And therefore groweth ſlowly. And for the *Pine*, and *Firre* likewiſe, they haue ſo much *Heat* in themſelues, as they need leſſe the *Heat* of the *Sunne*. There be *Herbs* alſo, that haue the ſame difference; As the *Herbe* they call *Morſus Diaboli*; which putteth the *Root* downe ſo low, as you cannot pull it vp without *Breaking* which gaue Occaſion to the *Name*, and *Fable*; For that it was ſaid, it was ſo wholeſome a *Root*, that the *Deuill*, when it was gathered, bit it for *Enuy*: And ſome of the *Ancients* doe report, that there was a Goodly *Firre*, (which they deſired to remoue whole,) that had a *Root* vnder *Ground* eight Cubits deep; And ſo the *Root* came vp broken.

654 It hath beene obſerued, that a *Branch* of a *Tree*, being *Vnbarked* ſome ſpace at the Bottome, and ſo ſet into the *Ground*, hath growen, Euen of ſuch *Trees*, as if the *Branch* were ſet with the *Barke* on, they would not grow; yet contrariwiſe we ſee, that a *Tree* Pared round in the *Body*, aboue

Ground,

Ground, will die. The *Cauſe* may be, for that the *Vnbarkt Part* draweth the Nouriſhment beſt, but the *Barke* continueth it only.

655 *Grapes* will continue *Freſh*, and *Moiſt*, all Winter long, if you hang them, *Cluſter* by *Cluſter*, in the *Roofe* of a *Warme Roome*; Eſpecially, if when you gather the *Cluſter*, you take off with the *Cluſter* ſome of the *Stocke*.

656 The *Reed* or *Cane* is a *watry Plant*, and groweth not but in the *Water*; It hath theſe Properties; that it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughes*, though many *Stalkes* come out of one *Root*. It differeth much in Greatneſſe; The ſmalleſt being fit for Thatching of Houſes; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bigneſſe, is vſed for Angle-Rods, and Staues; And in *China* for beating of Offenders vpon the Thighes. The differing *Kindes* of them are; The *Common Reed*; The *Caſſia Fiſtula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the eaſieſt, and riſeth againe. It ſeemeth, that amongſt *Plants*, which are nouriſhed with *Mixture* of *Earth* and *Water*, it draweth moſt Nouriſhment from *Water*; which maketh it the *Smootheſt* of all others in *Barke*; And the *Holloweſt* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thicke*; As *Apples*. Some *Gummy*; As *Cherries*. Some *Froathy*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* ſeemeth to be (almoſt) towards the *Barke* only; For if you cut the *Tree*, a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be drie. The *Trees*, which haue the *Moiſteſt Iuyces* in their *Fruit*, haue commonly the *Moiſteſt Sap* in their *Body*; For the *Vines* and *Peares* are very *Moiſt*; *Apples* ſomewhat more *Spongie*: The *Milke* of the *Figge* hath the quality of the *Rennet*, to gather *Cheeſe*: And ſo haue certaine *Sowre Herbs* wherewith they make *Cheeſe* in *Lent*.

658 The *Timber* and *Wood* are, in ſome *Trees*, more *Cleane*, in ſome more *Knottie*: And it is a good Triall, to trie it by Speaking at one End, and Laying the Eare at the Other: For if it be *Knotty*, the Voice will not paſſe well. Some haue the *Veines* more varied, and chamlotted; As *Oake*, whereof *wainſcot* is made; *Maple*, whereof *Trenchers* are made: Some more ſmooth, as *Firre*, and *Walnut*: Some doe more eaſily breed *Wormes* and *Spiders*; Some more hardly, as it is ſaid of *Iriſh Trees*: Beſides, there be a Number of Differences that concerne their vſe; As *Oake*, *Cedar*, and *Cheſnut*, are the beſt Builders: Some are beſt for *Plough-Timber*; As *Aſh*: Some for *Peeres*, that are ſometimes wet, and ſometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walnuts*: Some for *Ship-Timber*; As *Oaks* that grow in *Moiſt Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnance*; Wherein *Engliſh* and *Iriſh Timber* are thought to excell: Some for *Maſts* of *Ships*; As *Firre*, and *Pine*, becauſe of their

Length

Length, Straightneſſe, and lightneſſe: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Aſh*: And ſo of the reſt.

659 The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is ſometimes *Caſuall*: For many haue beene tranſlated, and haue proſpered well, As *Damaske-Roſes*, that haue not beene knowne in *England* aboue an hundred yeares, and now are ſo common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Naturall*; As the *Firre* and *Fine* loue the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, loue *Riuers*, and *Moiſt Places*: The *Aſh* loueth *Coppices*; But is beſt in *Standards* alone: *Iuniper* loueth *Chalke*; And ſo doe moſt *Fruit-Trees*: *Sampire* groweth but vpon *Rockes*: *Reeds* and *Oſiers* grow where they are waſhed with *Water*: The *Vine* loueth Sides of *Hills*, turning vpon the *South-Eaſt Sunne*, &c.

660 The *Putting forth* of certaine *Herbs* diſcouereth of what Nature the *Ground* where they put forth, is: As *Wilde Thyme* ſheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* ſhew *Grounds* fit for Wood: *Camomill* ſheweth Mellow *Grounds* fit for *wheat*. *Muſtard Seed*, growing after the *Plough*, ſheweth a good *Strong Ground* alſo for *Wheat*: *Burnet* ſheweth good *Meadow*: And the like.

661 There are found, in diuers *Countries*, ſome other *Plants*, that grow out of *Trees* and *Plants*, beſides *Miſſeltoe*: As in *Syria*, there is an *Herbe* called *Caſſytas*, that groweth out of tall *Trees*, and windeth it ſelfe about the ſame *Tree* where it groweth; And ſometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewiſe an *Herbe* called *Faunos*, vpon the *Wilde Oline*. And an *Herbe* called *Hippophaſton* vpon the *Fullers Thorne*; Which, they ſay, is good for the *Falling-Sickneſſe*.

662 It hath beene obſerued, by ſome of the *Ancients*, that howſoeuer *Cold* and *Eaſterly Winds*, are thought to bee great Enemies to *Fruit*; yet neuertheleſſe *South-winds* are alſo found to doe Hurt; Eſpecially in the *Bloſſoming* time; And the more, if *Showers* follow. It ſeemeth they call forth the *Moiſture* too faſt. The *weſt-winds* are the beſt. It hath beene obſerued alſo that *Greene* and *Open winters* doe hurt *Trees*; In ſo much as if two or three ſuch *winters* come together, *Almond-Trees*, and ſome other *Trees*, will dye. The *Cauſe* is the ſame with the former, becauſe the *Luſt* of the *Earth* ouerſpendeth it ſelfe; Howſoeuer ſome other of the *Ancients* haue commended *warme Winters*.

663 *Snowes*, lying long, cauſe a *Fruitfull Yeare*: For firſt, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) ſucke the *Water*, as out of the *Teate*. Thirdly, the *Moiſture* of *Snow* is the fineſt *Moiſture*; For it is the *Froth* of the *Cloudy waters*.

664 *Showers*, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moiſt Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for Plentie, than for Goodneſſe; For the beſt *Wines* are in the Drieſt *Vintages*: *Small Showers* are likewiſe good for *Corne*, ſo as

Parching Heats come not vpon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not to fall vpon them: And wee see, euen in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Euening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easilieſt *Soften*, is commended; And yet some *Earth* of that kinde will bee very Dry, and Hard before the *Showers*. The *Earth* that casteth vp from the *Plough*, a Great *Clod*, is not so good, as that which casteth vp a Smaller *Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldy*, is not good. The *Earth*, that smelleth well vpon the Digging, or Plowing, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-Bowes*, fall more vpon one kinde of *Earth* than vpon another: As it may well bee; For that that *Earth* is most Roscide: And therefore it is commended for a Signe of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *withered*, or *Blasted* at the Top, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Chessome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two Extremes of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Plowed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Iuyce*.

666 It is strange, which is obserued by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnesse* of *Trees*; And of *Vines*, by name; In so much as they cast Dust vpon them of purpose. It should seeme, that that Powdring, when a Shower commeth, maketh a kinde of Soyling to the *Tree*, being *Earth* and *water*, finely laid on. And they note, that Countries, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalkes* and *Leaues* of *Lupines* about the *Roots*; Or to Plow them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them vpon *land*, doth much Good. And it was generally receiued of old, that the *Dunging* of *Grounds*, when the *West-Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more thirstie, and open, to receiue the *Dung*.

668 The *Grafting* of *Vines* vpon *Vines*, (as I take it,) is not now in vse: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary Manner of *Grafting*: The Second was *Terebration*, thorow the *Middle* of the *Stocke*, and Putting in the *Cions* there: And the Third was Paring of two *Vines*, that grow together, to the *Marrow* and Binding them close.

669 The *Diseases* and ill *Accidents* of *Corne*, are worthy to bee enquired;

And

And would be more worthy to be inquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mildew* is one of the Greatest; which (out of question) commeth by *Closeneſſe* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it ſeldome commeth; Such as is with vs *York's weald*. This cannot be remedied, otherwiſe than that in *Countries* of Small Encloſure, the *Grounds* bee turned into larger *Fields*: Which I haue knowen to doe good in ſome Farmes. Another *Diſeaſe* is the *Putting forth* of *wilde Oats*, whereinto *Corne* oftentimes, (eſpecially *Barley*) doth degenerate. It happeneth chiefly from the *weakneſſe* of the *Graine* that is ſowen; For if it bee either too Old, or Mouldy, it will bring forth *wilde Oats*. Another *Diſeaſe* is the *Suciety* of the *Ground*; For if you ſow one *Ground* ſtill with the ſame *Corne*, (I meane not the ſame *Corne* that grew vpon the ſame *Ground*,) but the ſame *Kinde* of *Graine*; (As *wheat*, *Barley*, &c.) it will proſper but poorely: Therefore beſides the *Reſting* of the *Ground*, you muſt varie the *Seed*. Another ill *Accident* is, from the *winds*, which hurt at two times; At the *Flowring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with vs is rare; But in Hotter *Countries*, common: Inſomuch as the Word, *Calamitas*, was firſt deriued from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Ouer-wet* at *Sowing-time*; which with vs breedeth much *Dearth*; Inſomuch as the *Corne* neuer commeth vp; And (many times) they are forced to reſow *Sommer-Corne*, where they ſowed *winter-Corne*. Another ill *Accident* is *Bitter Froſts*, continued, without *Snow*, Eſpecially in the Beginning of the *winter*, after the *Seed* is new Sowen. Another *Diſeaſe* is *wormes*; which ſometimes breed in the *Root*, and happen vpon Hot *Sunnes*, and *Showers*, immediately after the *Sowing*; And another *worme* breedeth in the *Eare* it Selfe; Eſpecially when *Hot Sunnes* breake often out of *Clouds*. Another *Diſeaſe* is *weeds*; And they are ſuch, as either Choake, and Ouer-ſhadow the *Corne*, and beare it downe; Or ſtarue the *Corne*, and deceiue it of Nouriſhment. Another *Diſeaſe* is, *Ouer-Ranckneſſe* of the *Corne*; Which they vſe to remedy, by *Mowing* it after it is come vp; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harueſt*. Another ill *Accident* is, if the *Seed* happen to haue touched *Oyle*, or any *Thing*, that is *Fat*; For thoſe *Subſtances* haue an *Antipathy* with *Nouriſhment* of *Water*.

The *Remedies* of the *Diſeaſes* of *Corne* haue beene obſerued as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſeruatiue*. The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* ſound: It hath not beene practiſed, but it is thought to bee of vſe, to make ſome *Miſtellane* in *Corne*; As if you ſow a few *Beanes* with *wheat*, your *wheat* will be the better. It hath beene obſerued, that the *Sowing* of *Corne* with *Houſleeke*, doth good. Though *Graine*, that

toucheth *Oile*, or *Fat*, receiueth hurt, yet the *Steeping* of it, in the *Dregs* of *Oile*, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to aſſure it againſt *wormes*. It is reported alſo, that if *Corne* bee *Mowed*, it will make the *Graine* Longer, but Emptier, and hauing More of the *Huske*.

671 It hath beene noted, that *Seed* of a yeere old, is the Beſt; And of two or three yeeres is Worſe; And that which is more Old, is quite Barren; Though (no doubt) ſome *Seeds* and *Graines* laſt better than others. The *Corne*, which in the *Vanning* lieth loweſt, is the beſt; And the *Corne*, which broken or bitten retaineth a little *Yellowneſſe*, is better than that which is very *White*.

672 It hath beene obſerued, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furtheſt into the *Earth*; Inſomuch as it hath beene knowen to goe three Cubits deepe; And that it is the *Root* that continueth fit (longeſt) to be ſet againe, of any *Root* that groweth. It is a *Cold* and *Acide Herbe*, that (as it ſeemeth) loueth the *Earth*, and is not much drawen by the *Sunne*.

673 It hath beene obſerued, that ſome *Herbs* like beſt, being watred with *Salt-water*; As *Radiſh*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to ſome other *Herbs*; Eſpecially ſuch as are Strong; As *Tarragon*, *Muſtard-Seed*, *Rocket*, and the like.

674 It is ſtrange that is generally receiued, how ſome *Poyſonous Beaſts* affect *Odorate* and *Wholeſome Herbs*; As that the *Snake* loueth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other Couerture, that they take liking in, than the Vertue of the *Herbe*.

675 It were a Matter of great Profit, (ſaue that I doubt it is too Coniecturall to venture vpon,) if one could diſcerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plentie*, or *Scarcitie*, by ſome *Signes* and *Prognoſticks*, in the Beginning of the Yeere: For as for thoſe, that are like to be in *Plentie*, they may be bargained for, vpon the *Ground*; As the Old Relation was of *Thales*; who to ſhew how eaſie it was for a *Philoſopher* to be rich, when hee fore-ſaw a great *Plentie* of *Oliues*, made a *Monopoly* of them. And for *Scarcitie*, Men may make Profit in keeping better the old Store. Long *Continuance* of *Snow* is beleeued to make a *Fruitfull Yeere* of *Corne*: An *Early winter*, or a verie *Late Winter*, a *Barren Yeere* of *Corne*: An Open and Serene *Winter*, an ill Yeere of *Fruit*: Theſe we haue partly touched before: But other *Prognoſticks* of like Nature are diligently to be enquired.

676 There ſeeme to be, in ſome *Plants*, *Singularities*, wherein they differ from all Other; The *Oliue* hath the *Oily Part*, only on the *Outſide*; Whereas all other *Fruits* haue it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernels*. The *Pomegranate* and *Pine-Apple* haue onely, amongſt *Fruits*, *Graines* diſtinct in ſeuerall *Cells*. No *Herbs* haue *Curled Leaues*, but *Cabbage*, and *Cabbage-Lettuce*. None haue double *Leaues*, one belonging to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoake*: No *Flower* hath that kinde of Spread that the *Woodbine* hath. This may bee a large Field of Contemplation; For it ſheweth that in the Frame of *Nature*, there is, in the Producing of ſome *Species*, a Compoſition of Matter, which happeneth oft, and may be much diuerſified: In others, ſuch as happeneth rarely, and admitteth little Variety: For ſo it is likewiſe in *Beaſts*: *Dogs* haue a Reſemblance with *Wolues*, and *Foxes*; *Horſes* with *Aſſes*; *Kine* with *Buffles*; *Hares* with *Conies*; &c. And ſo in *Birds*: *Kites* and *Keſtrells* haue a Reſemblance with *Hawkes*; *Common-Doues* with *Ring-Doues*, and *Turtles*; *Black-Birds* with *Throſhes* and *Mauiſſes*; *Crowes* with *Rauens*, *Dawes*, and *Choughs*, &c. But *Elephants*, and *Swine* amongſt *Beaſts*; And the *Bird* of *Paradiſe*, and the *Peacocke* amongſt *Birds*; And ſome few others; haue ſcarce any other *Species*, that haue Affinity with them.

Wee leaue the *Deſcription* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall Hiſtory*: Wherein *Mens diligence* hath beene great, euen to *Curioſity*: For our *Experiments* are only ſuch, as doe euer aſcend a Degree, to the *Deriuing* of *Cauſes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that ſome, both of the *Ancient* and *Moderne Writers*, haue alſo laboured, But their *Cauſes*, and *Axiomes*, are ſo full of Imagination, and ſo infected with the old Receiued *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

IT hath beene obſerued, by ſome of the *Ancients*, that *Skins*, (eſpecially of *Rams*,) newly pulled off, and applied to the *wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewiſe Heale them, and Cloſe them vp; And that the *whites* of *Egs* doe the ſame. The *Cauſe*, is a Temperate *Conglutination*; For both bodies are Clammy, and Viſcous, and doe bridle the *Deflux* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary touching *Healing* of *Wounds*. 677

YOu may turne (almoſt) all *Fleſh* into a *Fatty Subſtance*, if you take *Fleſh*, and cut it into Peeces, and put the Peeces into a *Glaſſe* couered with Parchment; And ſo let the *Glaſſe* ſtand ſix or ſeuen Houres in *Boyling Water*. It may be an *Experiment* of Profit, for Making of *Fat*, or *Greaſe* for many vſes; But then it muſt be of ſuch *Fleſh* as is not Edible; As *Horſes*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

Experiment Solitary touching *Fat diffuſed* in *Fleſh*. 678

IT is reported by one of the *Ancients*, that *New Wine* put into *Veſſels* well ſtopped, and the *Veſſels* let downe into the *Sea*, will accelerate very much, the Making of them Ripe and Potable. The ſame would be tried in *Wort*.

Experiment Solitary touching *Ripening* of *Drink* before the *Time*. 679

Experiment Solitary touching Piloſity and Plumage. 680

Beaſts are more *Hairy* than *Men*; and *Sauage Men* more than *Ciuill*; And the *Plumage* of *Birds* exceedeth the *Piloſity* of *Beaſts*. The *Cauſe* of the Smoothneſſe in *Men*, is not any Abundance of *Heat* and *Moiſture*, though that indeed cauſeth *Piloſity*; But there is requiſite to *Piloſity*, not ſo much *Heat* and *Moiſture*, as *Excrementitious Heat* and *Moiſture*: (For whatſoeuer aſſimilateth, goeth not into the *Haire*:) And *Excrementitious Moiſture* aboundeth moſt in *Beaſts*, and *Men* that are more *Sauage*. Much the ſame Reaſon is there of the *Plumage* of *Birds*; For *Birds* aſſimilate leſſe, and excerne more than *Beaſts*: For their *Excrements* are euer liquid, and their *Fleſh* (generally) more dry: Beſides, they haue not *Inſtruments* for *Vrine*; And ſo all the *Excrementitious Moiſture* goeth into the *Feathers*: And therefore it is no Maruell, though *Birds* bee commonly better Meat than *Beaſts*, becauſe their *Fleſh* doth aſſimilate more finely, and ſecerneth more ſubtilly. Againe, the *Head* of *Man* hath *Haire* vpon the *firſt Birth*, which no other *Part* of the *Body* hath. The *Cauſe* may be *Want* of *Perſpiration*: For much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by Inſenſible *Perſpiration*; And beſides, the *Skull* being of a more ſolid Subſtance, nouriſheth and aſſimilateth leſſe, and excerneth more: And ſo likewiſe doth the *Chinne*; We ſee alſo that *Haire* commeth not vpon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are *Parts* more *Perſpirable*. And *Children* likewiſe are not *Hairy*, for that their *Skins* are more *Perſpirable*.

Experiments Solitary touching the *Quickneſſe* of *Motion* in *Birds*. 681

Birds are of *Swifter Motion* than *Beaſts*: For the *Flight* of many *Birds* is *Swifter*, than the race of any *Beaſts*. The *Cauſe* is, for that the *Spirits* in *Birds*, are in greater Proportion, in compariſon of the Bulke of their Body, than in *Beaſts*: For as for the Reaſon that ſome giue, that they are partly Carried, whereas *Beaſts* goe, that is Nothing; For by that Reaſon Swimming ſhould be ſwifter, than Running: And that Kinde of *Carriage* alſo, is not without Labour of the *Wing*.

Experiment Solitary touching the different *Cleerneſſe* of the *Sea*. 682

The *Sea* is *Clearer*, when the *North-wind* bloweth, than when the *South-wind*. The *Cauſe* is, for that *Salt-water* hath a little *Oylineſſe* in the *Surface* thereof; As appeareth in very Hot daies: And againe, for that the *Southerne Wind* relaxeth the *Water* ſomewhat; As no *Water Boyling* is ſo Cleere as *Cold Water*.

Experiment Solitary touching the different *Heats* of *Fire* and *Boyling Water*. 683

Fire burneth *Wood*, making it firſt *Luminous*; Then *Blacke* and *Brittle*; And laſtly, *Broken* and *Incinerate*: *Scalding Water* doth none of theſe. The *Cauſe* is, for that by *Fire*, the *Spirit* of the *Body* is firſt *Refined*, and then *Emitted*; Whereof the *Refining*, or Attenuation cauſeth the *Light*; And the *Emiſſion*, firſt the *Fragility*, and after the *Diſſolution* into *Aſhes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* ſo much; And beſides Part of the *Water* entreth; Which doth increaſe the *Spirit*, and in a degree extinguiſh it: Therefore we ſee

that

that *Hot Water* will quench *Fire*. And againe wee see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*, (into which the water entreth not at all) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

Experiment Solitary touching the *Qualification* of *Heat* by *Moisture*. 684

THe *Bottome* of a *Vessell* of *Boyling Water*, (as hath beene observed) is not very much *Heated*; So as men may put their hand vnder the *Vessell*, and remoue it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth Coales, where it entreth; So it doth allay Heat, where it toucheth: And therefore note well, that *Moisture* although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe,) yet it worketh manifest Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold; As wee see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things Distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay we see more, that *Butter*, or *Oyle*, which in themselues are Inflammable, yet by Vertue of their *Moisture*, will doe the like.

Experiment Solitary touching *Yawning*. 685

IT hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary touching the *Hiccough*. 686

IT hath beene observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough*, is a *Lifting vp* of the *Stomacke*; which *Sneezing* doth somewhat depresse, and diuert the *Motion* another way. For first we see that the *Hiccough* commeth of *Fulnesse of Meat*, (especially in *Children*) which causeth an Extension of the *Stomacke*: We see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased, either by *Diuersion*; Or by *Detention* of the *Spirits*: *Diuersion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an earnest Study doth the like; As is commonly vsed: And *Vinegar* put to the *Nosthrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhabiteth the *Motion* of the *Spirits*.

Experiment Solitary touching *Sneezing*. 687

Looking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nosthrils*; For then the *Holding* vp of the *Nosthrils* against the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with

Water; And the *Drawing* of *Moiſture* to the *Eyes*, doth draw it to the *Noſthrils*, by *Motion* of *Conſent*; And ſo followeth *Sneezing*; As contrariwiſe the *Tickling* of the *Noſthrils* within, doth draw the *Moiſture* to the *Noſthrils*, and to the *Eyes* by *Conſent*; For they alſo will *Water*. But yet it hath beene obſerued, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they run with Water, will preuent it. Whereof the *Cauſe* is, for that the *Humour*, which was deſcending to the *Noſthrils*, is diuerted to the *Eyes*.

Experiment Solitary touching the *Tenderneſſe* of the *Teeth*. 688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cauſe* is double: The One, for that the *Reſiſtance* of *Bone* to *Cold*, is greater than of *Fleſh*; for that the *Fleſh* ſhrinketh, but the *Bone* reſiſteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth* are *Parts* without *Bloud*, Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we ſee, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* wax *Brittle*; And therefore it hath beene ſeene, that all *Contuſions* of *Bones*, in *Hard weather*, are more difficult to Cure.

Experiment Solitary touching the *Tongue*. 689

IT hath beene noted, that the *Tongue* receiueth, more eaſily, *Tokens* of *Diſeaſes*, than the other *Parts*; As of *Heats* within, which appeare moſt in the *Blackneſſe* of the *Tongue*. Againe, *Pied Cattell* are ſpotted in their *Tongues*, &c. The *Cauſe* is (no doubt,) the *Tenderneſſe* of the *Part*; which thereby receiueth more eaſily all *Alterations*, than any other *Parts* of the *Fleſh*.

Experiment Solitary touching the *Taſte*. 690

WHen the *Mouth* is out of *Taſte*, it maketh Things taſte, ſometimes *Salt*; Chiefly *Bitter*; And ſometimes *Loathſome*; But neuer *Sweet*. The *Cauſe* is, the *Corrupting* of the *Moiſture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathſome*; But *Sweet* neuer; For the reſt are *Degrees* of *Corruption*.

Experiment Solitary touching ſome *Prognoſticks* of *Peſtilentiall Seaſons*. 691

IT was obſerued in the *Great Plague* of the laſt Yeare, that there were ſeene, in diuers *Ditches*, and low *Grounds* about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the leaſt: Whereas *Toads* (vſually) haue no *Tailes* at all. Which argueth a great Diſpoſition to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewiſe, that *Roots*, (ſuch as *Carrets*, and *Parſnips*,) are more *Sweet*, and *Luſhious*, in Infectious Yeares, than in other Yeares.

Experiment Solitary touching *Speciall Simples* for *Medicines*. 692

WIſe *Phyſitians* ſhould with all diligence inquire, what *Simples* Nature yeeldeth, that haue extreme *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they Vndermine that which is *Hard*; They open that which is *Stopped*, And *Shut*; and they expell that which is *Offenſiue*, gently, without too much *Perturbation*. Of this Kinde are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this kinde

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is the *Dwarfe-Pine*; which is Proper for the *Iaundies*: Of this kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this kinde is *Piony*, which is Proper for *Stoppings* in the *Head*: Of this kind is *Fumitory*; which is Proper for the *Spleene*: And a Number of Others. Generally, diuers *Creatures* bred of *Putrifaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceiue, that the *Trochiſchs* of *Vipers*, (which are so much magnified,) and the *Fleſh* of *Snakes* some waies condited, and corrected, (which of late are growne into some Credit,) are of the same Nature. So the *Parts* of *Beasts Putrified*; (as *Caſtoreum*, and *Muske*, which haue extreme *Subtill Parts*,) are to be placed amongſt them. We see also that *Putrifactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The *Cauſe* is, for that *Putrifaction* is the Subtilleſt of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Liues* of *Liuing Creatures*, (which some of the *Paracelſians* say (if they could be taken downe,) would make vs *Immortall*;) the Next is for *Subtilty* of *Operation*, to take *Bodies Putrified*; Such as may be safely taken.

IT hath beene obserued by the *Ancients*, that *Much Vſe* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are vnable to generate, are (neuertheleſſe) also *Dimme Sighted*. The *Cauſe* of *Dimneſſe* of *Sight*, in the Former, is the *Expence* of *Spirits*: In the Latter, the *Ouer-moiſture* of the *Braine*: For the *Ouer-moiſture* of the *Braine* doth thicken the *Spirits Viſuall*, and obſtructeth their Paſſages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurreth as another *Cauſe*: wee see also that *Blindneſſe* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moiſture*; As the Swelling of their Thighes, the Looseneſſe of their Belly, the Smoothneſſe of their Skinne, &c. Experiments in Consort touching *Venus*. 693

The *Pleaſure* in the *Act of Venus* is the greatest of the *Pleaſures* of the *Senſes*: The Matching of it with *Itch* is vnproper; though that also be Pleasing to the touch. But the *Cauſes* are Profound. First, all the *Organs* of the *Senſes* qualifie the *Motions* of the *Spirits*; And make so many seuerall *Species* of *Motions*, and *Pleaſures* or *Diſpleaſures* thereupon, as there be *Diuerſities* of *Organs*. The *Inſtruments* of *Sight*, *Hearing*, *Taſte*, and *Smell*, are of seuerall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the *Pleaſure* of *Generation* a *Sixth Senſe*; And if there were any other differing *Organs*, and Qualified *Perforations*, for the *Spirits* to passe; there would be more than the *Fiue Senſes*: Neither doe we well know whether some *Beaſts*, and *Birds*, haue not *Senſes* that wee know not: And the very *Sent* of *Dogges* is almost a *Senſe* by it selfe. Secondly, the *Pleaſures* of the *Touch*, are greater and deeper than those of the other *Senſes*; As wee see in *Warming* vpon *Cold*; Or *Refrigeration* vpon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senſes*; So likewise are the *Pleaſures*. It is true, that the *Affecting* of the *Spirits immediately*, and (as it were) without an *Organ*, 694

Organ, is of the greateſt *Pleaſure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, wee ſee their great and ſudden Effect in fetching *Men* againe, when they ſwonne: For *Drinke*, it is certain, that the *Pleaſure* of *Drunkenneſſe*, is next the *Pleaſure* of *Venus*: And *Great Ioyes* (likewiſe) make the *Spirits* moue, and touch themſelues: And the *Pleaſure of Venus* is ſomewhat of the ſame Kind.

695 It hath beene alwaies obſerued, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The *Cauſe* is, for that the *Spirits* in a Body more Hot and dry, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and diſſipated; And in the *winter* more condenſed, and kept entire: But in *Bodies* that are Cold and Moiſt, (as *Womens* are,) the *Summer* doth Cheriſh the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abſtinence*, or *Intermiſſion* of the *Vſe* of *Venus*, in *Moiſt* and *well Habituate Bodies*, breedeth a *Number* of *Diſeaſes*; And eſpeciall dangerous *Impoſtumations*. The Reaſon is euident; For that it is a Principall *Euacuation*, eſpecially of the *Spirits*: For of the *Spirits*, there is ſcarce any *Euacuation*, but in *Venus*, and *Exerciſe*. And therefore the *Omiſſion* of either of them, breedeth all *Diſeaſes* of *Repletion*.

Experiments in Conſort touching the *Inſecta*.

The *Nature* of *Viuification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceiued, in Small, than in Great; and in vnperfect, than in perfect; and in Parts, than in whole: So the Nature of *Viuification* is beſt enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. Firſt, in *Diſcloſing* the *Originall* of *Viuification*. Secondly, in *Diſcloſing* the *Originall* of *Figuration*. Thirdly, in *Diſcloſing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, ſome *Obſeruations* in the *Inſecta*, to worke *Effects* vpon *Perfect Creatures*. Note that the word *Inſecta*, agreeth not with the Matter, but we euer vſe it for Breuities ſake, intending by it *Creatures bred of Putrefaction*.

696 The *Inſecta* are found to breed out of ſeuerall *Matters*: Some breed of *Mud* or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preſerue it ſelfe: And for *Dung*, all *Excrements* are the *Refuſe* and *Putrefactions* of *Nouriſhment*. Some breed in *Wood*, both Growing, and Cut down. *Quære* in what *woods* moſt, and at what Seaſons? We ſee that the *worms* with many Feet, which round themſelues into Balls, are bred chiefly vnder *Logs* of *Timber*, but not in the *Timber*; And they are ſaid to be found alſo, (many times,) in *Gardens*, where no *Logs* are. But it ſeemeth their

Generation

Generation requireth a *Couerture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therfore they are not *Venomous*, but (contrariwise) are held by the *Physitians* to clarifie the *Bloud*. It is obserued also that *Cimices* are found in the *Holes* of *Bed-sides*. Some breed in the *Haire* of *Liuing Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat arefied by the *Haire*. The *Excrements* of *Liuing Creatures*, doe not only breed *Insecta*, when they are Excerned, but also while they are in the *Body*; As in *Wormes*, whereto Children are most subiect, and are chiefly in the Guts. And it hath beene lately obserued by *Physitians*, that in many *Pestilent Diseases*, there are *wormes* found in the vpper Parts of the Body, where *Excrements* are not, but only *Humours Putrified*. *Fleas* breed principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-Straw* kept close and not Aired. It is receiued that they are killed by Strewing *Wormewood* in the *Rooms*. And it is truly obserued, that *Bitter Things* are apt, rather to kil, than engender *Putrifaction*; And they be things that are *Fat* or *Sweet*, that are aptest to *Putrifie*. There is a *worme*, that breedeth in *Meale*, of the shape of a large white *Magget*, which is giuen as a great Dainty to *Nightingales*. The *Moath* breedeth vpon *Cloth*, and other *Lanifices*; Especially if they be laid vp dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *worme* called a *weuill*, bred vnder *Ground*, and that feedeth vpon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing-Waters*; As the *Water-Spider*, that hath six Legs. The *Fly* called the *Gad-fly*, breedeth of somewhat that Swimmeth vpon the Top of the *Water*, and is most about *Ponds*. There is a *worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is obserued by some of the *Ancients*) turneth into a *Gnat*. It hath bin obserued by the *Ancients*, that there is a *Worme* that breedes in old *Snow*; and is of Colour Reddish, and dull of Motion, and dieth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly Viuifie. And the Reason of the Dying of the *worme*, may be the sudden Exhaling of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butter-flies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserued in *Cold*. It is affirmed both by *Ancient* and *Moderne Obseruation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Vitriol*,) is often cast in, to mend the working, there riseth suddenly a *Fly*, which sometimes moueth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene mouing in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Liuing Creatures*, will Viuifie, if it haue matter Proportionable. Now the great *Axiome* of *Viuification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Actiue Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth* and *Figured*. Now a *Spirit* dilated by so ardent a

Fire,

Fire, as that of the *Furnace*, as soone as euer it cooleth neuer so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we see in *Chymicall* Trialls. Briefly, most *Things Putrified* bring forth *Insecta* of seuerall Names; But we will not take vpon vs now, to Enumerate them all.

697 The *Insecta* haue beene noted by the *Ancients*, to feed little: But this hath not beene diligently obserued; For *Grashoppers* eat vp the *Greene* of whole *Countries*; And *Silke-wormes* deuoure leaues swiftly; And *Ants* make great Prouision. It is true, that *Creatures*, that Sleep and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Blood*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Blood*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* haue Extreme Varietie, but the *Similar Parts* little. It is true, that they haue, (some of them,) a *Diaphragme*, and an *Intestine*; And they haue all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *Long Life*: Yet *Bees* haue beene knowne to liue seuen yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to liue till they be Old: And *Eeles*, which many times breed of *Putrifaction*, will liue and grow very long: And those that Enterchange from *wormes* to *Flyes* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, haue beene kept in Boxes foure years at the least. Yet there are certaine *Flies*, that are called *Ephemera*, that liue but a day. The *Cause* is, the Exility of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might liue longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) reuiue easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the *Easie Dilating* of it by a little *Heat*. They stirre a good while after their *Heads* are off, or that they be cut in Peeces; which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698 The *Insecta* haue *Voluntary Motion*, and therefore *Imagination*; And whereas some of the *Ancients* haue said that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently obserued; For *Ants* goe rightly forwards to their Hills; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their Hiues. It may be *Gnats*, and *Flies*, haue their *Imagination* more mutable and giddy, as *Small Birds* likewise haue. It is said by some of the *Ancients*, that they haue onely the *Sense* of *Feeling*; which is manifestly vntrue: For if they goe forth-right to a Place, they must needs haue Sight: Besides they delight more in one *Flower*, or *Herb*, than in another, and therefore haue *Taste*. And *Bees* are called with *Sound* vpon *Brasse*, and therefore they haue *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Obseruations *concerning the* Insecta, *together with the* Enumeration

tion *of them, we referre to that Place, where wee meane to handle the* Title *of* Animal's *in generall.*

A *Man Leapeth* better with *weights*, in his *Hands*, than without. The *Cauſe* is, for that the *weight*, (if it be proportionable,) ſtrengtheneth the *Sinewes*, by *Contracting* them. For otherwiſe, where no *Contraction* is needfull, *weight* hindereth. As we ſee in *Horſe-Races*, *Men* are curious to fore-ſee, that there be not the leaſt *weight*, vpon the one *Horſe*, more than vpon the other. In *Leaping* with *Weights*, the *Armes* are firſt caſt backwards, and then forwards, with ſo much the greater Force: For the *Hands* goe backward before they take their Raiſe. *Quære*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* wee intend, doth not cauſe the *Spirits*, as it were, to breake forth with more Force: As *Breath* alſo drawen, and kept in, commeth forth more forcibly: And in *Caſting* of any *Thing*, the *Armes*, to make a greater Swing, are firſt caſt backward.

Experiment Solitary touching *Leaping*. 699

OF *Muſicall Tones*, and *Vnequall Sounds*, wee haue ſpoken before; But touching the *Pleaſure*, and *Diſpleaſure* of the *Senſes*, not ſo fully. *Harſh Sounds*, as of a *Saw*, when it is ſharpened; *Grinding* of one *Stone* againſt another; *Squeaking*, or *Skriching Noiſe*; make a *Shiuering* or *Horrour* in the *Body*, and ſet the *Teeth* on edge. The *Cauſe* is, for that the *Obiects* of the *Eare*, doe affect the *Spirits* (immediately) moſt with *Pleaſure* and Offence. We ſee, there is no *Colour* that affecteth the *Eye* much with *Diſpleaſure*: There be *Sights*, that are *Horrible*, becauſe they excite the *Memory* of *Things* that are *Odious*, or *Fearefull*; But the ſame *Things Painted* doe little affect. As for *Smells*, *Taſtes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulſion* of the *Body*, of the *Obiect*. So it is *Sound* alone, that doth immediately, and incorporeally, affect moſt: This is moſt manifeſt in *Muſicke*; and *Concords* and *Diſcords* in *Muſicke*: For all *Sounds*, whether they be ſharpe, or Flat, if they be Sweet, haue a Roundneſſe and *Equalitie*; And if they bee Harſh, are *Vnequall*: For a *Diſcord* it ſelfe is but a *Harſhneſſe* of *Diuers Sounds Meeting*. It is true, that *Inequality*, not Stayed vpon, but Paſſing, is rather an Encreaſe of *Sweetneſſe*; As in the *Purling* of a *Wreathed String*; And in the *Raucitie* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Diſcord* ſtraight falling vpon a *Concord*: But if you ſtay vpon it, it is *Offenſiue*; And therefore, there be theſe three *Degrees* of *Pleaſing* and *Diſpleaſing* in *Sounds*; *Sweet Sounds*; *Diſcords*; *and Harſh Sounds*, which wee call by diuers Names, as *Skriching*, or *Grating*, ſuch as we now ſpeake of. As for the *Setting* of the *Teeth* on *Edge*, we ſee plainly, what an Intercourſe there is, between the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, betweene the *Teeth*, and *Striking* vpon the *String*.

Experiment Solitary touching the *Pleaſures*, and *Diſpleaſures* of the *Senſes*, eſpecially of *Hearing*. 700

NATV-

Chap. VII. Of the Nature of Animal's in general.

Experiments Solitary touching Leaping 699

A Man Leaps better with Weights in his Hands, than without. The Cause is, for that the Weight, (if it be proportionable,) stirring the Sinews, by Contributing them. For otherwise, where no Contribution is needful, Weight hindereth. As we see in Horse-Races, Greyhounds are curious to fore-see, that there be not the least weight, upon the one Horse, more than upon the other. In Leaping with Weights, the Arms are first cast backwards, and then forwards, with so much the greater force: For the Hands goe backward before they take their Rise. Againe, if the contrary Motion of the Spirits, immediately before the Motion we intend, doth not cause the Spirits, as it were, to break forth with more Force: As Bends allo drawen, and kept in, commeth forth more forcibly: And in Casting of any Thing, the Arme, to make a greater Swing, are first cast backward.

Experiments Solitary touching the Pleasure, and Displeasure of the Sense, pertaining to Hearing 700

O But touching the Pleasure, and Displeasure of the Sense, not so fully. Harsh Sounds, as of a Saw, when it is ingrated, or Grinding of one Stone against another; Squeaking, or Shrieking Noise, make a Shuddering or Horror in the Body, and set the Teeth on edge. The Cause is, for that the Organs of the Ears, do affect the Spirits (immediately) most with Pleasure and Offence. We see, there is no Colour that affecteth the Eye much with Displeasure: There be Sights, that are Horrible, because they excite the Memory of Things that are Odious, or Fearful, but the same Things Painted affect not. As for Smells, Tasts, and Touches, they be Things that do affect by a Participation, or Impression of the Body, or the Object. So it is Sound alone, that doth immediately, and Incorporeally, affect most: This is not manifest in Musicke, and Concord and Discord in Musicke: For all Sounds, whether they be Sharp, or Flat, if they be Sweet, have a Roundness and Fulness: And if they be Harsh, are Rugged: For a Discord it selfe is but a Multitude of Divers Sounds Meeting. It is true, that Tunes delight, not Stayed upon, but Passing, is rather an Exercise of Smelling: As in the Passing of a Perfumed Sweet, And in the Winding of a Trumpet: And in the Nightingale's Pipe of a Reed. And in a Discord Playing upon a Concord: But if you stay upon it, it is Offensive. And therefore, there be three Degrees of Playing and Diffusing in Sound: Sweet Sounds; Discords; and Harsh Sounds, which we call by divers Names, as Shrilling, or Grating, such as we now speake of. As for the Sense of the Touch or Feele, we see plainly, what an Inter-

course there is, between the Feele, and the Organ of the

Hearing, by the Taking of the End of a Bow,

between the Teeth, and Striking

upon the String.

NATV-

NATVRALL HISTORIE.

VIII. Century.

THere be *Minerals*, and *Foſſiles*, in great Varietie; But of *Veines* of *Earth Medicinall*, but few; The chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *Wounds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arreſting* the *Spreading* of *Poyſon*, *Infection*, and *Putrifaction*: And they haue, of all other *Simples*, the Perfectest and Pureſt *Quality* of *Drying*, with little or no Mixture of any other *Quality*. Yet it is true, that the *Bole-Armenicke* is the moſt *Cold* of them; And that *Terra Lemnia* is the moſt *Hot*: For which Cauſe, the *Iſland Lemnos*, where it is digged, was in the Old *Fabulous Ages* conſecrated to *Vulcan*.

Experiment Solitary touching *Veines* of *Medicinall Earth*.

701

ABout the bottome of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the ſides of *Rockes*, being as it were a large, but tough *Moſſe*. It is the more to be noted, becauſe that there be but few *Subſtances*, *Plant-like*, that grow deep within the *Sea*; For they are gathered ſometimes fifteen Fathom deep; And when they are laid

Experiment Solitary touching the *Growth* of *Sponges*.

702

laid on Shore, they ſeeme to be of great Bulke; But cruſhed together, will be tranſported in a very ſmall Roome.

Experiment Solitary touching *Sea-Fiſh*, put in *Freſh Waters*.

703

IT ſeemeth, that *Fiſh*, that are vſed to the *Salt-water*, doe neuertheleſſe delight more in *Freſh*. We ſee, that *Salmons*, and *Smelts*, loue to get into *Riuers*, though it be againſt the *Streame*. At the *Hauen* of *Conſtantinople*, you ſhall haue great *Quantities* of *Fiſh* that come from the *Euxine Sea*; that when they come into the *Freſh water*, do inebriate and turne vp their *Bellies*; So as you may take them with your Hand. I doubt there hath not been ſufficient *Experiment* made of Putting *Sea-Fiſh* into *Freſh-Water*, *Ponds*, and *Pooles*. It is a thing of great Vſe, and Pleaſure: For ſo you may haue them new at ſome good diſtance from the *Sea*: And beſides, it may be, the *Fiſh* will eat the pleaſanter, and may fall to breed, And it is ſaid, that *Colcheſter Oyſters*, which are put into Pits, where the *Sea* goeth and commeth (but yet ſo, that there is a *Freſh-Water* alſo comming to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary touching *Attraction* by *Similitude* of *Subſtance*.

704

THe *Turkiſh-Bow* giueth a very Forcible *Shoot*; Inſomuch as it hath bin known, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Braſſe* of two Inches thicke: But that which is more ſtrange, the *Arrow*, if it be Headed with *wood*, hath beene knowne to pierce thorow a Peece of *wood*, of eight Inches thicke. And it is certaine, that we had in vſe at one time, for *Sea-Fight*, ſhort *Arrowes*, which they called *Sprights*, without any other Heads, ſaue *Wood* ſharpned; which were diſcharged out of *Muskets*, and would pierce thorow the ſides of *Ships*, where a *Bullet* would not pierce. But this dependeth vpon one of the greateſt *Secrets* in all *Nature*; Which is, that *Similitude* of *Subſtance* will cauſe *Attraction*, where the Body is wholly freed from the *Motion* of *Grauity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the helpe of the *Load-Stone*. But this ſame *Motion* of *Weight* or *Grauity* (which is a meere *Motion* of the *Matter*, and hath no Affinity with the *Forme* or *Kinde*,) doth kill the other *Motion*, except it ſelfe be killed by a violent *Motion*; As in theſe *Inſtances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Subſtance*, beginneth to ſhew it ſelfe. But we ſhall handle this Point of *Nature* fully in due Place.

Experiment Solitary touching certaine *Drinkes* in *Turkey*.

705

THey haue in *Turkey*, and the *Eaſt*, certaine *Confections*, which they call *Seruets*, which are like to *Candied Conſerues*; And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and ſome other Flowers; And ſome Mixture of *Amber* for the more delicate Perſons; And thoſe they diſſolue in *Water*, and thereof make their *Drinke*, becauſe they are forbidden *Wine* by the *Law*. But I doe much marueil, that no *Engliſhman*, or *Dutchman*, or *German*, doth ſet vp *Brewing* in *Conſtantinople*; Conſidering they haue ſuch Quantity of *Barley*. For as for the

the generall Sort of *Men*, Frugality may be the *Cauſe* of *Drinking Water*; For that it is no ſmall Sauing, to pay nothing for ones *Drinke:* But the better Sort mought well be at the Coſt. And yet I wonder the leſſe at it, becauſe I ſee *France*, *Italy*, or *Spaine*, haue not taken into vſe, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that ſhould begin it in *Turkey*.

Experiments in Conſort, touching *Sweat*.

706 IN *Bathing* in *Hot water*, *Sweat* (neuertheleſſe) commeth not in the *Parts* vnder the *water*. The *Cauſe* is; Firſt, for that *Sweat* is a Kind of *Colliquation*. And that Kind of *Colliquation* is not made, either by an *Ouer-Dry Heat*, or an *Ouer-Moiſt Heat*. For *Ouer-Moiſture* doth ſomewhat extinguiſh the *Heat*; As we ſee that euen *Hot water* quencheth *Fire:* And *Ouer-Dry Heat* ſhutteth the *Pores:* And therefore *Men* will ſooner *Sweat* couered before the *Sunne* or *Fire*, than if they ſtood Naked; And *Earthen Bottles*, filled with *Hot Watter*, doe prouoke, in Bed, a *Sweat* more daintily, than *Brick-bats Hot*. Secondly, *Hot water* doth cauſe *Enaporation* from the *Skin*; So as it ſpendeth the Matter, in thoſe Parts vnder the *water*, before it iſſueth in *Sweat*. Againe, *Sweat* commeth more plentifully, if the *Heat* be increaſed by *Degrees*, than if it be greateſt at firſt, or equall. The *Cauſe* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening, the *Sweat* iſſueth more abundantly. And therefore *Phyſitians* may doe well, when they prouoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorificke Herbs* in *Hot water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *leſſe Heated* firſt, and after halfe an houre the *more Heated*.

707 *Sweat* is *Salt* in Taſte; The *Cauſe* is, for that, that *Part* of the *Nouriſhment*, which is *Freſh* and *Sweet*, turneth into *Bloud*, and *Fleſh*; And the *Sweat* is only that *Part* which is *Separate* and *Excerned*. *Bloud* alſo Raw, hath ſome *Saltneſſe*, more than *Fleſh*; becauſe the *Aſſimilation* into *Fleſh*, is not without a little and ſubtile *Excretion* from the *Bloud*.

708 *Sweat* commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The *Reaſon* is, becauſe thoſe *Parts* are more repleniſhed with *Spirits*; And the *Spirits* are they that put forth *Sweat:* Beſides, they are leſſe *Fleſhie*, and *Sweat* iſſueth (chiefly) out of the *Parts* that are leſſe *Fleſhie*, and more *Drie*; As the *Fore-head*, and *Breaſt*.

709 Men *Sweat* more in *Sleepe* than *Waking*; And yet *Sleepe* doth rather ſtay other *Fluxions*, than cauſe them; As *Rheumes*, *Looſeneſſe* of the *Body*, &c. The *Cauſe* is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally moue inwards, and there reſt. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate; And thereby expelleth *Sweat*.

710 *Cold Sweats* are (many times) *Mortall*, and neere *Death*; And alwayes *Ill*, and *Suſpected*; As in *Great Feares*, *Hypochondriacall Paſſions*, &c. The *Cauſe* is, for that *Cold Sweats* come by a *Relaxation* or *Forſaking* of the

Spirits, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, seuereth, and issueth out.

711 In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the latter Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moueth to an *Expulsion* indifferent ouer all the *Body*.

Experiment Solitary touching the *Glo-worme*.

712 THe *Nature* of the *Glo-worme* is hitherto not well obserued. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes* and *Hedges*. Whereby it may be conceiued, that the *Spirit* of them is very fine, and not to be refined but by *Summer Heats*: And againe, that by reason of the Fineness, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly vpon *Fens*, and *Marrishes*. But yet the two former *Obseruations* hold; For they are not seene but in the *Heat* of *Summer*; And *Sedge*, and other *Greene* of the *Fens*, giue as good Shade, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *winged*.

Experiments in Consort, touching the *Impressions*, which the *Passions* of the *Minde* make vpon the *Body*.

713 THe *Passions* of the *Minde*, worke vpon the *Body* the *Impressions* following. *Feare* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire vpright*; *Starting*; and *Skriteching*. The *Paleness* is caused, for that the *Bloud* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing Vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *skin*, the *Haire* that lieth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that Kinde, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the Matter should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore when a *Man* would listen suddenly to any Thing, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions* though they be vnprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* vpon *Paine*.

714 *Griefe* and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; Distorting of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the drawing in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the ſame Thing ſtronger. *Groaning*, and *Screaming*, and *Roaring*, are cauſed by an *Appetite* of *Expulſion*, as hath beene ſaid: For when the *Spirits* cannot expell the Thing that hurteth, in their ſtriſe to do it, by *Motion* of *Conſent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and giue ouer to reſiſt; For if one doe conſtantly reſiſt *Paine*, he will not groane. *Teares* are cauſed by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by conſequence aſtringeth the *Moiſture* of the *Braine*; and thereby ſendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compreſſion* cauſeth alſo *Wringing* of the *Hands*; For *Wringing* is a *Geſture* of *Expreſſion*, of *Moiſture*. The *Diſtorting* of the *Face* is cauſed by a *Contention*, firſt to bear and reſiſt, and then to expell. Which maketh the Parts knit firſt, and afterwards open. *Grinding* of the *Teeth* is cauſed (likewiſe) by a *Gathering* and *Serring* of the *Spirits* together to reſiſt; Which maketh the *Teeth* alſo to ſet hard one againſt another. *Sweating* is alſo a *Compound Motion* by the *Labour* of the *Spirits*, firſt to reſiſt, and then to expell.

Ioy cauſeth a *Chearefulneſſe*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And ſometimes *Teares*. All theſe are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Liuely*, and *Stirring*. We know it hath beene ſeene, that *Exceſſiue ſudden Ioy*, hath cauſed *Preſent Death*, while the *Spirits* did ſpread ſo much, as they could not retire againe. As for *Teares*, they are the Effects of *Compreſſion* of the *Moiſture* of the *Braine*, vpon *Dilatation* of the *Spirits*. For *Compreſſion* of the *Spirits* worketh an *Expreſſion* of the *Moiſture* of the *Braine*, by *Conſent*, as hath beene ſaid in *Griefe*. But then in *Ioy*, it worketh it diuerſly; *viz.* by *Propulſion* of the *Moiſture*, when the *Spirits* dilate, and occupy more Roome.

Anger cauſeth *Paleneſſe* in ſome, and the *Going* and *Comming of the Colour* in Others: Alſo *Trembling* in ſome; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fiſt*. *Paleneſſe*, and *Going*, and *Comming* of the *Colour*, are cauſed by the *Burning* of the *Spirits* about the *Heart*; Which to refreſh themſelues call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly ioyned with ſome *Feare*; But in many there is no *Paleneſſe* at all, but contrariwiſe *Redneſſe* about the *Cheekes*, and *Gils*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Reuenge*. *Trembling* in *Anger* is likewiſe by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is ioyned with *Feare*. *Swelling* is cauſed, both by a *Dilatation* of the *Spirits* by *Ouer-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the ſame *Cauſe*, being an *Ebullition*. *Stamping*, and *Bending* of the *Fiſt*, are cauſed by an *Imagination* of the *Act* of *Reuenge*.

Light Diſpleaſure or *Diſlike*, cauſeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Brows*. Theſe *Effects* ariſe from the ſame *Cauſes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a leſſe degree. For the *Shaking* of the *Head* is but a Slow and

715 716 717

Definite *Trembling*; And is a *Gesture* of *Slight Refusall*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which we vse when we refuse a Thing, or warne it away. The *Frowning* and *Knitting* of the *Browes*, is a *Gathering* or *Serring* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes*, will follow vpon earnest *Studying*, or *Cogitation* of any Thing, though it be without *Dislike*.

718 *Shame* causeth *Blushing*; And *Casting downe* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame* is the *Part* that laboureth most. And although the *Blushing* will be seen in the whole *Breast*, if it be Naked, yet that is but in Passage to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reuerence* a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmely vpon Others: And we see that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when we come before Many; *Ore Pompeij, quid mollius? Nunquàm non coram pluribus erubuit:* And likewise when we come before *Great*, or *Reuerend Persons*.

719 *Pity* causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye aside*. *Teares* come from the same *Cause* that they doe in *Griefe*; for *Pity* is but *Griefe* in anothers Behalfe. The *Cast* of the *Eye* is a *Gesture* of *Auersion*, or *Lothnesse* to behold the *Obiect* of *Pity*.

720 *Wonder* causeth *Astonishment*, or an *Immoueable Posture* of the *Body*; *Casting* vp of the *Eyes* to *Heauen*, And *Lifting* vp of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* vpon one *Obiect* of *Cogitation*, whereby it doth not spatiate and transcurre, as it vseth: For in *wonder* the *Spirits* flie not, as in *Feare*; But onely settle, and are made lesse apt to moue. As for the *Casting* vp of the *Eyes*, and *Lifting* vp of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Author*, by *Power*, and *Prouidence*, of *Strange Wonders*.

721 *Laughing* causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interiection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eies* with *water*, if it be Violent, and Continued. Wherein first it is to bee vnderstood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there euer precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is Proper to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deepe an *Impression* as in other *Passions*. And therefore (that which hath no *Affinity* with the *Passions* of the *Minde*) it is moued, and that in great vehemency, only by *Tickling* some *Parts* of the *Body*: And we see that *Men* euen in a *Grieued State* of *Minde*, yet cannot sometimes forbeare *Laughing*. Thirdly, it is euer ioyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinity* with *Ioy*, though it be a much *Lighter Motion*: *Res seuera est verum Gaudium*. Fourthly, that the *Obiects* of it is *Deformity*, *Absurdity*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these

Generall Notes giue ſome *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulſion* of the *Breath* and *Voice*, and *Shaking* of the *Breſt* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Eſpecially being Sudden. So likewiſe, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where we ſpake of the *Teares* of *Ioy* and *Griefe*,) is an Effect of *Dilatation* of the *Spirits*. And for *Suddenneſſe*, it is a great *Part* of the *Matter*: For we ſee, that any *Shrew'd Turne* that lighteth vpon Another; Or any *Deformitie*, &c. moueth *Laughter* in the Inſtant; Which after a little time it doth not. So we cannot *Laugh* at any Thing after it is *Stale*, but whileſt it is *New*: And euen in *Tickling*, if you *Tickle* the *Sides*, and giue warning; Or giue a *Hard* or *Continued Touch*, it doth not moue *Laughter* ſo much.

Luſt cauſeth a *Flagrancie* in the *Eyes*; and *Priapiſme*. The *Cauſe* of both theſe is, for that in *Luſt*, the *Sight*, and the *Touch*, are the Things deſired: And therefore the *Spirits* reſort to thoſe parts, which are moſt affected. And note well in generall, (For that great Vſe may be made of the *Obſervation*,) that (euermore) the *Spirits*, in all *Paſſions*, reſort moſt to the *Parts*, that labour moſt, or are moſt affected. As in the laſt, which hath beene mentioned, they reſort to the *Eyes*, and *Venereous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light diſlikes* to the *Head*. 722

IT hath beene obſerued by the *Ancients*, and is yet beleeued, that the *Sperme* of *Drunken Men* is *Vnfruitfull*. The *Cauſe* is, for that it is *Ouermoiſtened*, and wanteth *Spiſſitude*. And wee haue a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*. Experiments in Conſort touching *Drunkenneſſe*. 723

Drunken Men are taken with a plaine *Deffect*, or *Deſtitution* in *Voluntary Motion*. They Reele; They tremble; They cannot ſtand, nor ſpeake ſtrongly. The *Cauſe* is, for that the *Spirits* of the *Wine*, oppreſſe the *Spirits Animall*, and occupate Part of the Place, where they are; And ſo make them Weake to moue. And therefore *Drunken Men* are apt to fall aſleepe: And *Opiates*, and *Stupefactiues*, (as *Poppie*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkenneſſe*, by the *Groſſeneſſe* of their *Vapour*; As *Wine* doth by the *Quantitie* of the *Vapour*. Beſides, they rob the *Spirits Animall* of their *Matter*, whereby they are nouriſhed: For the *Spirits* of the *Wine* prey vpon it, as well as they: And ſo they make the *Spirits* leſſe Supple, and Apt to moue. 724

Drunken Men imagine euery *Thing turneth round*; They imagine alſo that *Things Come vpon them*; They *See* not well *Things a farre off*, Thoſe Things that they *See neare hand*, they *See out of their Place*; And (ſometimes) they *ſee Things double*. The *Cauſe* of the Imagination that *Things turne round*, is, for that the *Spirits* themſelues turne, being compreſſed by the *Vapour* of the *Wine*: (For any *Liquid Body* vpon *Compreſſion*, turneth, as we ſee in *Water*:) And it is all one to the *Sight*, whether the *Viſuall Spirits* moue, or the *Obiect* moueth, or the *Medium* moueth. And wee ſee that long *Turning Round* breedeth the ſame Imagination. 725

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The *Cauſe* of the Imagination that *Things come upon them*, is; for that the *Spirits Viſuall* themſelues draw backe; which maketh the *Obiect* ſeeme to come on; And beſides, when they ſee Things turne Round, and Moue, *Feare* maketh them thinke they come vpon them. The *Cauſe* that they cannot ſee *Things a farre off*, is the *Weakneſſe* of the *Spirits*; for in euery *Megrim*, or *Vertigo*, there is an *Obtenebration* ioyned with a Semblance of *Turning round*; Which we ſee alſo in the lighter Sort of *Swounings*. The *Cauſe* of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Viſuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The *Cauſe* of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppreſſed,) to and fro; For, (as was ſaid before,) the *Motion* of the *Spirits Viſuall*, and the *Motion* of the *Obiect*, make the ſame *Appearances*; And for the *Swift Motion* of the *Obiect*, we ſee, that if you fillip a *Lute-ſtring*, it ſheweth double, or Treble.

726 *Men* are ſooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth leſſe, than *Wine Pure*. The *Cauſe* of the Former is, for that the *Wine* deſcendeth not ſo faſt to the *Bottome* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and ſendeth *Vapours* faſter to the *Head*; And therefore inebriateth ſooner. And, for the ſame Reaſon, *Sops* in *Wine*, (Quantitie for Quantitie,) inebriate more, than *Wine* of it ſelfe. The *Cauſe* of the Latter is, for that the *Sugar* doth inſpiſſate the *Spirits* of the *Wine*, and maketh them not ſo eaſie to reſolue into *Vapour*. Nay further, it is thought to bee ſome Remedie againſt *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the ſame Effect is wrought either by *Oyle*, or *Milke*, taken vpon much *Drinking*.

Experiment Solitary touching the *Helpe* or *Hurt* of *Wine*, though *Moderately vſed*.

727 THe *Vſe* of *Wine*, in *Drie*, and *Conſumed Bodies*, is hurtfull; In *Moiſt*, and *Full Bodies*, it is good. The *Cauſe* is, for that the *Spirits* of the *Wine* doe prey vpon the *Dew*, or *Radicall Moiſture*, (as they terme it) of the *Bodie*, and ſo deceiue the *Animall Spirits*. But where there is *Moiſture* Enough, or Superfluous, there *Wine* helpeth to diſgeſt, and deſiccate the *Moiſture*.

Experiment Solitary touching *Catterpillers*.

728 THe *Catterpiller* is one of the moſt Generall of *wormes*, and breedeth of *Dew*, and *Leaues*: For we ſee infinite Number of *Catterpillers*, which breed vpon *Trees*, and *Hedges*; By which the *Leaues* of the *Trees*, or *Hedges*, are in great Part conſumed; As well by their Breeding out of the *Leafe*, as by their Feeding vpon the *Leafe*. They breed in the *Spring* chiefly, becauſe then there is both *Dew*, and *Leafe*. And they breed commonly when the *Eaſt-Winds* haue much blowne: The *Cauſe* whereof is, the *Drineſſe* of that *Wind*: For to all *Viuification* vpon *Putriſaction*, it is requiſite the *Matter* be not too *Moiſt*: And therefore we ſee, they haue *Copwebs* about them, which is a ſigne of a *Slimy Drineſſe*: As we ſee vpon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all ouer.

We

Wee see also the *Greene Catterpiller* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest and the most, breed vpon *Cabbages*, which haue a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* towards the *End* of *Summer*, waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps some other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* vpon him, and seemeth to haue Affinitie with the *Silke-worme*.

Experiment Solitary touching the *Flyes Cantharides*. 729

THe *Flyes Cantharides* are bred of a *worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpenesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosiue*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersiue*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no maruell though *Cantharides* haue such a *Corrosiue*, and *Canterizing Qualitie*; For there is not any other of the *Insects*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may bee, that the delicate-coloured *Dragon-Flyes*, may haue likewise some *Corrosiue Quality*.

Experiments in Consort, touching *Lassitude*. 730

Lassitude is remedied by *Bathing*, or *Anointing* with *Oyle*, and *Warme Water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Anointing* giue a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *water*, is better than either of them alone; Because *water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by Chearing or Comforting of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischageth *wearinesse*; as *Sleepe* likewise doth.

731

In *Going vp a Hill*, the *Knees* will be most *weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a Man *Goeth vp the Hill*, the Weight of the *Body* beareth most vpon the *Knees*; And in *Going downe the Hill*, vpon the *Thighes*.

Experiment Solitary touching the *Casting* of the *Skin*, and *Shell*, in some *Creatures*. 732

THe *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; But not rightly: For that were to make euery *Casting* of the *Skin* a New *Birth*: And besides, the *Secundine* is but a generall *Couer*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crayfish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skinnes* are found, but the *Old Shells* neuer: So as it is like, they scale off, and crumble away by degrees. And they are knowne by the Extreme *Tendernesse* and *Softnesse*

of

of the *New Shell*; And ſometimes by the *Freſhneſſe* of the *Colour* of it. The *Cauſe* of the *Caſting* of *Skin*, and *Shell*, ſhould ſeeme to be the great *Quantitie* of *Matter* in thoſe *Creatures*, that is fit to make *Skin*, or *Shell*, And Againe, the *Looſeneſſe* of the *Skin*, or *Shell*, that ſticketh not cloſe to the *Fleſh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we ſee, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And ſo *Birds*, that haue much *Matter* for their *Beake*, caſt their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Conſort, touching the *Poſtures* of the *Bodie*.

733

Lying, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered vp*, which is in the Poſture of the Body, is the more Wholeſome. The *Reaſon* is, the better *Comforting* of the *Stomach*, which is by that leſſe Penſile: And we ſee, that in Weake *Stomachs*, the Laying vp of the Legs high, and the Knees almoſt to the Mouth, helpeth, and comforteth. We ſee alſo that *Gally-Slaues*, notwithſtanding their Miſery otherwiſe, are commonly Fat and Fleſhy; And the Reaſon is, becauſe the *Stomach* is ſupported ſomewhat in *Sitting*; And is Penſile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to chooſe thoſe *Exerciſes*, where the *Limbs* moue more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing* being *Set*.

734

Megrims and *Giddineſſe* are rather when we *Riſe*, after long *Sitting*, than while we *Sit*. The *Cauſe* is, for that the *Vapours*, which were gathered by *Sitting*, by the Sudden *Motion*, fly more vp into the *Head*.

735

Leaning long vpon any *Part* maketh it *Nomme*, and, as wee call it, Aſleepe. The *Cauſe* is, for that the *Compreſſion* of the *Part* ſuffereth not the *Spirits* to haue free Acceſſe; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment Solitary touching *Peſtilentian Yeares*.

736

IT hath beene noted, that thoſe *Yeares* are *Peſtilentiall*, and *Vnwholeſome*, when there are great Numbers of *Frogs*, *Flies*, *Locuſts*, &c. The *Cauſe* is plaine; For that thoſe *Creatures* being engendred of *Putrifaction*, when they abound, ſhew a generall *Diſpoſition* of the *Yeare*, and *Conſtitution* of the *Aire*, to *Diſeaſes* of *Putrifaction*. And the ſame *Prognoſticke*, (as hath beene ſaid before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Conſtitution* of the *Aire*, appeareth more ſubtilly, in any of theſe *Things*, than to the *Senſe* of *Man*.

Experiment Solitary touching the *Prognoſticks* of *Hard Winters*.

737

IT is an Obſeruation amongſt *Country-People*, that *Yeares* of *Store* of *Haws* and *Heps*, doe commonly portend *Cold Winters*; And they aſcribe it to *Gods Prouidence*, that, (as the *Scripture* ſaith) reacheth euen to the *Falling of a Sparrow*; And much more is like to reach to the *Preſeruation* of *Birds* in ſuch *Seaſons*. The *Naturall Cauſe* alſo may be the *Want* of *Heat*, and *Abundance* of *Moiſture*, in the *Summer* precedent; Which putteth forth thoſe *Fruits*, and muſt needs leaue great *Quantitie* of *Cold Vapours*,

pours, not dissipate; Which causeth the *Cold* of the *Winter* following.

THey haue in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as *Blacke* as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tauernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berry Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*) of which the *Turkes* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after seuerall manners, For *Coffa* and *Opium* are taken downe, *Tobacco* but in *Smoake*; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quære* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, Root, and Flower; Of *Folium Indum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had, And of the *Scarlet Powder*, which they call *Kermez*; And (generally) of all such Things, as doe inebriate, and prouoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible euer than *Leaues*.

Experiment Solitary touching *Medicines* that *Condense*, and *Relieue* the *Spirits*. 738

THe *Turkes* haue a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay vnder their *Eye-lids*; Which doth colour them Blacke; Whereby the *White* of the *Eye* is set off more *White*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* vsed to paint their *Eyes*. The *Turkes* vse with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And diuers with vs, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* Blacke, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the *Chineses*, who are of an ill Complexion, (being Oliuaster,) they paint their *Cheekes* Scarlet; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe Naked, doe not only paint Themselues, but they pownce and raze their Skinne, that the *Painting* may not be taken forth. And make into Workes. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would haue the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will haue *Gay Skins*, in stead of *Gay Cloathes*.

Experiment Solitary touching *Paintings* of the *Body*. 739

IT is strange, that the *Vse* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as vsuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with vs it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the Vse of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because that their *Drinking*

Experiment Solitary touching the *Vse* of *Bathing* and *Anointing*. 740

king Water, and *Feeding* vpon *Rize*, and other Food of ſmall nourithment, maketh their *Bodies* ſo Solide, and Hard, as you need not feare that *Bathing* ſhould make them *Frouthie*. Beſides, the *Turkes* are great *Sitters*, and ſeldome walke; Whereby they Sweat leſſe, and need *Bathing* more. But yet certaine it is, that *Bathing*, and eſpecially *Annointing*, may be ſo vſed, as it may be a great Helpe to *Health*, and *Prolongation* of *Life*. But hereof we ſhall ſpeake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary touching *Chamoletting* of *Paper*. 741

THe *Turkes* haue a Pretty Art of *Chamoletting* of *Paper*, which is not with vs in vſe. They take diuers *Oyled Colours*, and put them ſeuerally (in drops) vpon *water*; And ſtirre the *Water* lightly; And then wet their *Paper*, (being of ſome Thickneſſe,) with it; And the *Paper* will be Waued, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary touching *Cuttle-Inke*. 742

IT is ſomewhat ſtrange, that the *Blond* of all *Birds*, and *Beaſts*, and *Fiſhes*, ſhould be of a *Red Colour*, and only the *Blond* of the *Cuttle* ſhould be as *Blacke* as *Inke*. A Man would thinke, that the *Cauſe* ſhould be the *High Concoction* of that *Blond*; For we ſee in ordinary *Puddings*, that the *Boyling* turneth the *Blond* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Requeſt.

Experiment Solitary touching *Encreaſe* of *weight* in *Earth*. 743

IT is reported of Credit, that if you take *Earth* from Land adioyning to the *Riuer* of *Nile*; And preſerue it in that manner, that it neither come to be Wet, nor Waſted; And Weigh it daily, it will not alter *weight* vntill the ſeuenteenth of *Iune*, which is the Day when the *Riuer* beginneth to riſe; And then it will grow more and more *Ponderous*, till the *Riuer* commeth to his Heighth. Which if it bee true, it cannot bee cauſed, but by the *Aire*, which then beginneth to Condenſe; And ſo turneth within that ſmall *Mould* into a degree of *Moiſture*; Which produceth *Weight*. So it hath been obſerued, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loſeth Weight; And after being laid in the open *Aire*, recouereth *Weight* againe. And it ſhould ſeeme, that as ſoone as euer the *Riuer* beginneth to increaſe, the whole *Body* of the *Aire* thereabouts ſuffereth a Change: For (that which is more ſtrange,) it is credibly affirmed, that vpon that very Day, when the *Riuer* firſt riſeth, great *Plagues* in *Cairo*, vſe ſuddenly to breake vp.

Experiments in Conſort touching *Sleepe*. 744

THoſe that are very *Cold*, and eſpecially in their *Feet*, cannot get to *Sleepe*. The *Cauſe* may be, for that in *Sleepe* is required a *Free Reſpiration*, which *Cold* doth ſhut in, and hinder: For wee ſee, that in great *Colds*, one can ſcarce draw his *Breath*. Another *Cauſe* may be, for that *Cold* calleth the *Spirits* to ſuccour; And therefore they cannot ſo well cloſe, and goe together in the *Head*; Which is euer requiſite to *Sleepe*. And for the ſame *Cauſe*, *Paine*, and *Noiſe* hinder *Sleepe*; And *Darkneſſe* (contrariwiſe) further eth *Sleepe*.

Some

Some *Noiſes* (whereof we ſpake in the 112. *Experiment*) helpe *Sleepe*; As the *Blowing* of the *wind*, the *Trickling* of *water*, *Humming* of *Bees*, *Soft Singing Reading*, &c. The *Cauſe* is, for that they moue in the *Spirits* a gentle *Attention*; And whatſoeuer moueth *Attention*, without too much Labour, ſtilleth the Naturall and diſcurſiue *Motion* of the *Spirits*. 745

Sleepe nouriſheth, or at leaſt preſerueth *Bodies*, a long time, without other *Nouriſhment*. *Beaſts* that ſleepe in *Winter*, (as it is noted of *wilde Beares*,) during their *Sleep*, wax very Fat, though they Eat nothing. *Bats* haue beene found in Ouens, and other Hollow Cloſe Places, Matted one vpon another; And therefore it is likely that they *Sleepe* in the *Winter time*, and eat Nothing. *Quære*, whether *Bees* doe not *Sleep* all Winter, and ſpare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lie as *Dead* all *winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, reuiue againe. A *Dormouſe*, both *winter* and *Summer*, will *Sleepe* ſome dayes together, and eat *Nothing*. 746

To reſtore *Teeth* in *Age*, were *Magnalia Naturæ*. It may bee thought of. But howſoeuer the *Nature* of the *Teeth* deſerueth to be enquired of, as well as the other *Parts* of *Liuing Creatures Bodies*.

Experiments in Conſort touching *Teeth* and *Hard Subſtances* in the *Bodies* of *Liuing Creatures*.

There be Fiue *Parts* in the *Bodies* of *Liuing Creatures*, that are of *Hard Subſtance*; The *Skull*; The *Teeth*, The *Bones*; The *Hornes*; and the *Nailes*. The greateſt *Quantity* of *Hard Subſtance* Continued, is towards the *Head*. For there is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillarie Bones*; There is the *Hard Bone*, that is the *Inſtrument* of *Hearing*; And thence iſſue the *Hornes*: So that the *Building* of *Liuing Creatures Bodies*, is like the *Building* of a *Timber-Houſe*, where the *walls* and other *Parts* haue *Columnes* and *Beames*; But the *Roofe* is, in the better Sort of *Houſes*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they haue Three other *Hard Subſtances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* haue *Teeth*: The *Shell* of the *Egge*: And their *Quils*: For as for their *Spurre*, it is but a *Naile*. But no *Liuing Creatures*, that haue *Shels* very hard; (As *Oyſters*, *Cockles*, *Muſſles*, *Scallops*, *Crabs*, *Lobſters*, *Cra-Fiſh*, *Shrimps*, and eſpecially the *Tortoiſe*,) haue *Bones* within them, but onely little *Griſtles*. 747

Bones, after full Growth, continue at a Stay: And ſo doth the *Skull*: *Hornes*, in ſome *Creatures*, are caſt and renued: *Teeth* ſtand at a Stay, except their Wearing: As for *Nailes*, they grow continually: And *Bils* and *Beakes* will ouer-grow, and ſometimes be caſt; as in *Eagles*, and *Parrots*.

Moſt of the *Hard Subſtances* flie to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nailes*, and *Beakes*: Only the *Bones* are more *Inward*, and clad with *Fleſh*. As for the *Entrailes*, they are all without *Bones*; Saue that a *Bone* is (ſometimes) found in the *Heart* of a *Stag*; And it may be in ſome other *Creature*. 749

750 The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Backe-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* haue another. The *Iaw-Bones* haue no *Marrow* Seuered, but a little *Pulpe* of *Marrow* diffuſed. *Teeth* likewiſe are thought to haue a kinde of *Marrow* diffuſed, which cauſeth the *Senſe* and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Senſe*; No more than *Bloud*. *Horne* is alike thorowout; And ſo is the *Naile*.

751 None other of the *Hard Subſtances* haue *Senſe*, but the *Teeth*: And the *Teeth* haue *Senſe*, not onely of *Paine*, but of *Cold*.

But we will leaue the Enquiries *of other* Hard Subſtances, *vnto their ſeuerall Places; And now enquire only of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed Teeth*, or *Canine*, which are betweene both. But there haue been ſome *Men*, that haue had their *Teeth vndiuided*, as of one whole *Bone*, with ſome little Marke in the Place of the Diuiſion; as *Pyrrhus* had. Some *Creatures* haue *Ouer-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs*, though leſſe. Some *Liuing Creatures* haue *Teeth* againſt *Teeth*; As *Men*, and *Horſes*; And ſome haue *Teeth*, eſpecially their *Maſter-Teeth*, indented one within Another, like *Sawes*; As *Lions*; And ſo againe haue *Dogs*. Some *Fiſhes* haue diuers *Rowes* of *Teeth*, in the *Roofes* of their *Mouthes*; As *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt-Waters*. *Snakes* and other *Serpents*, haue *Venemous Teeth*; which are ſometimes miſtaken for their *Sting*.

753 No *Beaſt* that hath *Hornes*, hath *Vpper Teeth*; And no *Beaſt*, that hath *Teeth* aboue, wanteth them below: But yet if they be of the ſame kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet *è conuerſo*; For *Doe's*, that haue no *Hornes*, haue no *Vpper Teeth*.

754 *Horſes* haue, at three yeares old, a *Tooth* put forth, which they call the *Coks Tooth*; And at foure yeeres old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Peaſe* within it; And that weareth ſhorter and ſhorter, euery yeare; Till that at eight yeares old, the *Tooth* is ſmooth, aud the *Hole* gone; And then they ſay; *That the Marke is out of the Horſes Mouth*.

755 The *Teeth* of *Men* breed firſt, when the *Childe* is about a yeere and halfe old: And then they caſt them, and new come about ſeuen yeares old. But diuers haue *Back-ward Teeth* come forth at Twentie, yea ſome at Thirty, and Forty. *Quære* of the manner of the *Commiug* of them forth. They tell a Tale of the old *Counteſſe* of *Deſmond*, who liued till ſhe was ſeuen-ſcore yeeres old, that ſhe did *Dentire*, twice, or thrice; Caſting her old *Teeth*, and others comming in their Place.

756 *Teeth* are much hurt by *Sweet-Meats*; And by *Painting* with *Mercury*; And by *Things Ouer-hot*; And by *Things Ouer-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the ſharpeſt of *Paines*.

Concerning

757

Concerning *Teeth*, these Things are to bee Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-Ach*. 5. The *Binding in* of *Artificiall Teeth*, where *Teeth* haue beene ſtrucken out. 6. And laſt of all, that Great One, of *Reſtoring Teeth* in *Age*. The *Inſtances* that giue any likelihood of *Reſtoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in ſome; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quare* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to haue beene prouoked by *Art*; Therefore let *Triall* bee made, whether *Hornes* may bee procured to grow in *Beaſts* that are not *Horned*, and how? And whether they may bee procured to come *Larger* than vſuall; As to make an *Oxe*, or a *Deere*, haue a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spotted*, may be brought againe to be more *Branched*; For theſe *Trialls*, and the like, will ſhew, whether by *Art* ſuch *Hard Matter* can be called, and prouoked. It may be tried alſo, whether *Birds* may not haue ſome thing done to them, when they are *Young*, whereby they may be made to haue *Greater*, or *Longer Bils*; Or *Greater* and *Longer Tallons*? And whether *Children* may not haue ſome *waſh*, or Something to make their *Teeth Better*; and *Stronger*? *Corall* is in vſe as an Helpe to the *Teeth* of *Children*.

Experiments in Conſort, touching the *Generation* and *Bearing* of *Liuing Creatures* in the *Wombe*.

758

SOme *Liuing Creatures generate* but at certaine *Seaſons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And moſt Sorts of *Birds*, and *Fiſhes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domeſticke Creatures*; As *Horſes*, *Hogges*, *Dogges*, *Cats*, &c. The *Cauſe* of *Generation* at *all Seaſons* ſeemeth to bee *Fulneſſe*: For *Generation* is from *Redundance*. This *Fulneſſe* ariſeth from two *Cauſes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moiſt*, and *Sanguine*; Or from *Plenty* of *Food*. For the firſt, *Men*, *Horſes*, *Dogs*, &c. which breed at all Seaſons, are full of *Heat* and *Moiſture*; *Doues* are the fulleſt of *Heat* and *Moiſture* amongſt *Birds*, and therefore breed often; The *Tame Doue* almoſt continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearefulneſſe*, and the *Hardneſſe* of their *Fleſh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildneſſe*, and for that they ſeldome *Drinke*. Moſt ſort of *Birds* are of a dry *Subſtance* in compariſon of *Beaſts*. *Fiſhes* are cold. For the ſecond *Cauſe*, *Fulneſſe* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we ſee that thoſe *Creatures*, which being *Wilde*, generate ſeldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulneſſe* of *Food*. We finde, that the Time of *Going* to *Rut* of *Deere*, is in *September*; For that they need the whole *Summers Feed* and *Graſſe*, to make them fit for *Generation*. And if *Raine* come Early about the Middle of *September*, they goe to Rut ſomewhat the ſooner; If *Drought*, ſomewhat the later. So *Sheepe*, in reſpect of their ſmall *Heat*, generate about the ſame time, or ſomewhat before. But for the moſt part, *Creatures* that generate at cer-

raine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of Generation: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest she is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Egges*, or *Young Ones*, out of the *Neasts* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759 Of *Living Creatures*, some are *Longer time* in the *Wombe*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six Moneths; *Do's* goe about nine Moneths; *Mares* eleuen Moneths; *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Receiued *Tradition* of ten Yearers is *Fabulous*. For *Birds* there is double Enquiry; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diuersity* of *Time*, than amongst other *Creatures*; yet some there is: for the *Hen* sitteth but three Weekes; The *Turkey-Hen*, *Goose*, and *Ducke*, a Moneth. *Quære* of others. The *Cause* of the great *Difference* of *Times*, amongst *Liuing Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Wombe*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Wombe*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *wombe*, are long time in *Comming* to their full *Growth*. But in most other Kindes, the *Constitution* of the *Wombe*, (that is, the *Hardnesse* or *Drinesse* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *wombe*. As for *Birds*, as there is lesse Diuersity amongst them, in the time of their *Bringing forth*; So there is lesse Diuersity in the time of their *Growth*; Most of them comming to their *Growth* within a Twelue-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*, As *Women*, *Lionesses*, &c. This may be caused either by the *Quantity* of *Sperme* required to the *Producing* One of that Kinde; which if lesse bee required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Wombe*, which may seuer the *Sperme*.

Experiments in Consort touching *Species Visible*.

761 THere is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling* in the *Bottome* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottome* of the *Water*. I haue heard of a Practise, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diuer* Diueth, hauing his *Eyes* open, and swimmeth vpon his *Backe*,

Backe; whether (I say) he seeth things in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Obiect* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Obiect* in the *Finer*, how it worketh I know not.

762 It would be well boulted out, whether great *Refractions* may not bee made vpon *Reflections*, as well as vpon *Direct Beames*. For Example, We see that take an *Empty Basen*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Basen*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflection*. To proceed therefore, put a *Looking-Glasse*, into a *Basen* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beauty* and *Strangenesse*, were a fine Proofe: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole* of *Water*, you shall place ouer against it a *Picture* of the *Deuill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Deuils Picture* aside, not seeing the *water*, it will looke like a *Deuill* indeed. They haue an old Tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeples*: Which was thought to be done by *Glasses*, when he walked vpon the *Ground*.

Experiments in Consort, touching *Impulsion* and *Percussion*.

763 A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Torpour* of *Solid Bodies*, Which beside their *Motion* of *Grauity*, haue in them a *Naturall Appetite*, not to moue at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* vpon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be Pensile, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neere as easily, as if it were already in *Motion*.

764 A *Body Ouer-great*, or *Ouer small*, will not bee throwne so farre as a *Body* of a *Middle Size*: So that (it seemeth) there must bee a *Commensuration*, or *Proportion*, betweene the *Body Moued*, and the *Force*, to make it moue well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moueth*, and the *Resistance* of the *Body* that is *Moued*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too small*, it resisteth too little.

765 It is *Common Experience*, that no *weight* will presse or cut so strong, being laid vpon a *Body*, as Falling, or strucken from aboue. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moued*, haue by *Impulsion*, or by the *Motion* of *Grauity continued*, a *Compression* in them, as well downwards, as they haue when they are throwne, or Shot thorow the *Aire*.

forwards. I conceiue alſo, that the quicke *Looſe* of that *Motion*, preuenteth the *Reſiſtance* of the *Body* below; And *Priority* of the *Force* (alwaies) is of great *Efficacy*; As appeareth in infinite *Inſtances*.

Experiment Solitary touching *Titillation*.
766

Tickling is moſt in the *Soles* of the *Feet*, and vnder the *Arme-Holes*, and on the *Sides*. The *Cauſe* is, the *Thinneſſe* of the *Skinne* in thoſe *Parts*; Ioyned with the Rareneſſe of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinneſſe* of the *Skin*, and *Suddennеſſe*, and *Rareneſſe* of *Touch*, doe further: For we ſee, a *Feather*, or a *Ruſh* drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuſe*, or a *Touch* more *Hard*, doth not. And for *Suddennеſſe*; We ſee no *Man* can tickle himſelfe: We ſee alſo, that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not Tickliſh, becauſe it is accuſtomed to be Touched. *Tickling* alſo cauſeth *Laughter*. The *Cauſe* may be, the *Emiſſion* of the *Spirits*, and ſo of the *Breath*, by a Flight from *Titillation*; For vpon *Tickling*, we ſee there is euer a *Starting*, or *Shrinking* away of the Part, to auoid it; And we ſee alſo, that if you Tickle the *Noſthrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emiſſion* of the *Spirits*, that doe likewiſe expell the *Moiſture*. And *Tickling* is euer Painfull, and not well endured.

Experiment Solitary touching the *Scarcity* of *Raine* in *Ægypt*.
767

IT is ſtrange, that the *Riuer* of *Nilus*, Ouer-flowing as it doth, the *Country* of *Ægypt*, there ſhould be neuertheleſſe little or no *Raine* in that *Country*. The *Cauſe* muſt be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be aſcribed, either vnto the *Long Race* of the *Water*; For *Swift Running Waters* vapour not ſo much as *Standing Waters*; Or elſe to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not ſo much as *Waters Raw*; No more than *Waters* vpon the Fire doe vapour ſo much, after ſome time of Boyling, as at the firſt. And it is true, that the *Water* of *Nilus* is ſweeter than other *Waters* in Taſte; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which ſheweth it is *Leneſſing*: And it runneth thorow a *Country* of a *Hot Climate*, and flat, without Shade, either of *Woods*, or *Hills*; Whereby the *Sunne* muſt needs haue great Power to *Concoct* it. As for the *Aire*, (from whence I conceiue this Want of Showers commeth chiefly;) The *Cauſe* muſt be, for that the *Aire* is, of it ſelfe, *Thin* and *Thirſty*; And as ſoone as euer it getteth any *Moiſture* from the *Water*, it imbibeth, and diſſipateth it, in the whole body of the *Aire*; And ſuffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary touching *Clarification*.
768

IT hath beene touched in the *Title* of *Percolations*, (Namely ſuch as are *Inwards*,) that the *whites* of *Egs*, and *Milke*, doe clarifie; And it is certaine, that in *Ægypt*, they prepare and clarifie the *water* of *Nile*, by putting it into great *Iarres* of *Stone*, and Stirring it about with a few

Stamped

Stamped *Almonds*; Wherewith they alſo beſmeare the Mouth of the *Veſſell*; And ſo draw it off, after it hath reſted ſome time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Muſt*, to haſten, and perfect the *Clarifying*.

Experiment Solitary touching *Plants* without *Leaues*. 769

THere be ſcarce to be found any *Vegetables*, that haue *Branches*, and no *Leaues*; except you allow *Corall* for one. But there is alſo in the *Deſarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leaueleſſe, Browne of Colour, and Branched like *Corall*, ſaue that it cloſeth at the *Top*. This being ſet in *Water* within *Houſe*, ſpreadeth and diſplayeth ſtrangely; And the people thereabouts haue a Superſtitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Eaſie Deliuerance*.

Experiment Solitary touching the *Materialls* of *Glaſſe*. 770

THe *Cryſtalline Venice Glaſſe*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pauia* by the *Riuer Ticinum*; And the *Aſhes* of a *weed* called by the *Arabs Kall*, which is gathered in a *Deſart* betweene *Alexandria* and *Roſetta*; And is by the *Ægyptians* vſed firſt for Fuell; And then they cruſh the *Aſhes* into Lumps, like a *Stone*; And ſo ſell them to the *Venetians* for their *Glaſſe-workes*.

Experiment Solitary touching *Prohibition* of *Putrefaction*, and the *Long Conſeruation of Bodies*. 771

IT is ſtrange, and well to be noted, how long *Carkaſſes* haue continued *Vncorrupt*, and in the former *Dimenſions*; As appeareth in the *Mummies* of *Ægypt*; Hauing laſted, as is conceiued, (ſome of them;) three thouſand yeeres. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* apteſt to corrupt. But that is nothing to the Wonder; For wee ſee, what a Soft and Corruptible *Subſtance* the *Fleſh*, of all the other *Parts* of the *Body*, is. But it ſhould ſeeme, that according to our *Obſeruation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceiue to be ſo *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haſte to *Corruption*, that is conceiued. And therefore *Bodies* in *Shining-Amber*; In *Quick-Siluer*; In *Balmes*, (whereof we now ſpeake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conſeruatories* of *Snow*; &c. are preſerued very long. It need not goe for Repetition, if we reſume againe that which we ſaid in the aforeſaid *Experiment*, concerning *Annihilation*; Namely, that if you prouide againſt three *Cauſes* of *Putrefaction*, *Bodies* will not corrupt: The firſt is, that the *Aire* be *excluded*; For that vndermineth the *Body*, and conſpireth with the *Spirit* of the *Body* to diſſolue it. The Second is, that the *Body Adiacent* and *Ambient* be not Commateriall, but meerely Heterogeneall towards the Body that is to bee preſerued: For if Nothing can be receiued by the One, Nothing can iſſue from the Other; Such are *Quicke-Siluer*, and *White-Amber*, to *Herbs*, and *Flies*, and ſuch *Bodies*. The Third is, that the *Body* to be preſerued, be not of that *Groſſe*, that it may corrupt within it ſelfe, although no Part of it iſſue into the *Body Adiacent*: And therefore it muſt be rather *Thin* and *Small*, than of *Bulke*. There is a Fourth *Remedie* alſo, which is;

That

That if the *Body* to be preſerued be of *Bulke*, as a *Corps* is, then the *Body* that Incloſeth it, muſt haue a Vertue to draw forth, and drie the *Moiſture* of the *Inward Body*; For elſe the *Putrifaction* will play within, though nothing iſſue forth. I remember *Liuy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; whereof the one contained the *Body* of *King Numa*; it being ſome foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Diſcipline* of the *Pontifes*; And that in the *Coffin* that had the *Bodie*, there was Nothing (at all) to be ſeen, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as freſh, as if they had beene but newly Written; being written in *Parchment*, and couered ouer with *watch-Candles* of *wax*, three or foure fold. By this it ſeemeth, that the *Romans*, in *Numa's* time, were not ſo good *Embalmers*, as the *Ægyptians* were; Which was the *Cauſe* that the Body was vtterly conſumed. But I find in *Plutarch*, and Others, that when *Auguſtus Cæſar* viſited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *Body* to keepe his *Dimenſion*; But withall, that, notwithſtanding all the *Embalming*, (which no doubt was of the beſt,) the *Body* was ſo Tender, as *Cæſar* touching but the *Noſe* of it, defaced it. Which maketh mee finde it very ſtrange, that the *Ægyptian Mummies* ſhould be reported to be as Hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Ægyptian Mummies*, were ſhrowded in a Number of Folds of *Linnen*, beſmeared with *Gummes*, in manner of *Seare-Cloth*; Which it doth not appeare was practiſed vpon the *Body* of *Alexander*.

Experiment Solitary touching the *Abundance* of *Nitre* in certaine *Sea-Shoares*.
772

NEare the *Caſtle* of *Catie*, and by the *Wells* of *Aſſan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good diſtance off: And it is Nothing, but the *Shining* of the *Nitre*, vpon the *Sea Sands*; Such *Abundance* of *Nitre* the Shores there doe put forth.

Experiment Solitary touching *Bodies* that are *borne vp* by *Water*.
773

THe *Dead-Sea*, which Vomiteth vp *Bitumen*, is of that *Craſſitude*, as *Liuing Bodies* bound Hand and Foot, caſt into it, haue been borne vp, and not ſunke. Which ſheweth, that all *Sinking* into *Water*, is but an *Ouer-weight* of the *Body*, put into the *Water*, in reſpect of the *Water*: So that you may make *Water* ſo ſtrong, and heauy, of *Quick-Siluer*, (perhaps,) or the like, as may beare vp *Iron*: Of which I ſee no Vſe, but Impoſture. We ſee alſo, that all *Metalls*, except *Gold*, for the ſame reaſon, ſwimme vpon *Quick-ſiluer*.

Experiment Solitary touching *Fuell*, that *conſumeth little*, or *nothing*.
774

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make Fires,) which burneth like a *Coale*, and diminiſheth not; But onely waxeth Brighter and Whiter. That it ſhould doe ſo, is not ſtrange; For we ſee *Iron* Red Hot burneth, and conſumeth not: But the ſtrangeneſſe is, that it ſhould continue any time

time ſo: For *Iron*, as ſoone as it is out of the Fire, deadeth ſtraightwaies. Certainly, it were a Thing of great Vſe, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet laſt long: Neither am I altogether Incredulous, but there may be ſuch *Candles*, as they ſay are made of *Salamanders wooll:* Being a Kinde of *Minerall*, which whiteneth alſo in the Burning, and conſumeth not. The Queſtion is this, *Flame* muſt be made of ſomewhat; And commonly it is made of ſome *Tangible Body*, which hath *weight*: But it is not impoſſible, perhaps, that it ſhould be made of *Spirit* or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *weight*;) ſuch as is the Matter of *Ignis Fatuus*. But then you will ſay, that that *Vapour* alſo can laſt but a ſhort time: To that it may be anſwered, That by the helpe of *Oile* and *wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *wieke* not burne.

Experiment Solitary *Oeconomicall* touching *Cheape Fuell.*

775

Sea-Coale laſt longer than *Char-Coale*; And *Char-Coale* of *Roots*, being coaled into great Peeces, laſt longer than Ordinary *Char-Coale*. *Turfe*, and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and laſt long. *Smal-Coale*, or *Briar-Coale*, powred vpon *Char-Coale*, make them laſt longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather becauſe it is good for Nothing elſe. Triall would be made of ſome Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* vſe it, priuily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be vſed purpoſely, and be made knowne, it is Sauing.

Experiment Solitary touching the *Gathering* of *Winde* for *Freſhneſſe.*

776

IT is, at this Day, in vſe, in *Gaza*, to couch *Pot-Sheards* or *Veſſels* of *Earth*, in their *walls*, to gather the *wind* from the Top, and to paſſe it downe in Spouts into *Roomes*. It is a Deuice for *Freſhneſſe*, in great Heats: And it is ſaid, there are ſome *Roomes* in *Italy*, and *Spaine*, for *Freſhneſſe*, and *Gathering* the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *winds*, and *Enlarging* them againe, and *Making* them *Reuerberate*, and *goe round* in *Circles*, rather than this *Deuice* of *Spouts* in the *wall*.

Experiment Solitary touching the *Trialls* of *Aires.*

777

THere would be vſed much diligence, in the Choiſe of ſome *Bodies*, and *Places*, (as it were) for the *Taſting* of *Aire*; to diſcouer the *wholſomeneſſe* or *Vnwholeſomeneſſe*, as well of *Seaſons*, as of the *Seats* of *Dwellings*. It is certaine, that there be ſome *Houſes*, wherein *Conſitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perſwaded, that a *Peece* of *Raw Fleſh*, or *Fiſh*, will ſooner corrupt in ſome *Aires*, than in Others. They be noble *Experiments*, that can make this *Diſcouery*; For they ſerue for a *Naturall Diuination* of *Seaſons*; Better than the *Aſtronomers* can by their *Figures*: And againe, they teach *Men* where to chuſe their *Dwelling*, for their better *Health*.

Experiment Solitary touching *Increa-*

THere is a Kind of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *water*, whereof *Cattell* drinke; which maketh them

giue

Eſſay of *Milke* in *Milch-Beaſts.* 778

giue more *Milke.* Surely, there would be ſome better Trialls made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe them* from *Murraine.* It may be; *Chalke*, and *Nitre*, are of the beſt.

Experiment Solitary touching *Sand* of the *Nature* of *Glaſſe.* 779

IT is reported, that in the *Valley*, neere the *Mountaine Carmel*, in *Iudea*, there is a *Sand*; which of all other, hath moſt affinity with *Glaſſe*; Inſomuch as other *Minerals*, laid in it; turne to a *Glaſſie Subſtance*; without the *Fire*; And againe *Glaſſe* put into it, turneth into the *Mother-Sand.* The thing is very ſtrange; if it be true: And it is likelieſt to be Cauſed by ſome *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not ſpeak of any *Eruption* of *Flames.* It were good to try in *Glaſſe-workes*, whether the *Crude Materials* of *Glaſſe*; mingled with *Glaſſe*, already made, and Re-moulten, doe not facilitate the *Making* of *Glaſſe* with leſſe *Heat.*

Experiment Solitary touching the *Growth* of *Corall.* 780

IN the *Sea*, vpon the *South-weſt* of *Sicily*; much *Corall* is found. It is a *Sub-Marine Plant.* It hath no *Leaues*: It brancheth only when it is vnder *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the *Aire*, it becommeth *Hard*, and *Shining* Red, as wee ſee. It is ſaid alſo, to haue a *White Berry*, But we finde it not brought ouer with the *Corall.* Belike it is caſt away as nothing worth: Inquire better of it; for the *Diſcouery* of the *Nature* of the *Plant.*

Experiment Solitary touching the *Gathering* of *Manna.* 781

THe *Manna* of *Calabria* is the beſt, and in moſt Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of ſuch *Mulberrie Trees*, as grow in the *Valley's.* And *Manna* falleth vpon the *Leaues* by *Night*, as other *Dewes* do. It ſhould ſeeme, that before thoſe *Dewes* come vpon *Trees*, in the *Valley's*, they diſſipate, and cannot hold out. It ſhould ſeeme alſo, the *Mulberry-Leafe*, it ſelfe, hath ſome Coagulating Vertue, which inſpiſſateth the *Dew*, for that it is not found vpon other *Trees*: And wee ſee by the *Silke-Worme*, which feedeth vpon that *Leafe*, what a Dainty Smooth *Iuyce* it hath; And the *Leaues* alſo, (eſpecially of the Blacke *Mulberry*,) are ſomewhat Briſtly, which may helpe to preſerue the *Dew.* *Certainly*, it were nor amiſſe, to obſerue a little better, the *Dewes* that fall vpon *Trees*, or *Herbs*, Growing on *Mountaines*; For it may be, many *Dewes* fall, that ſpend before they come to the *Valleyes.* And I ſuppoſe, that he that would gather the beſt *May-Dew* for *Medicine*, ſhould gather it from the *Hils.*

Experiment Solitary touching the *Correcting* of *Wine.* 782

IT is ſaid, they haue a manner, to prepare their *Greek-Wines*, to keepe them from *Fuming*, and *Inebriating*, by adding ſome *Sulphur*, or *Allome*: Whereof the one is *Vnctuous*, and the other is *Aſtringent.* And certaine it is, that thoſe two *Natures* doe beſt repreſſe *Fumes.* This *Experiment* would be transferred, vnto other *Wine*, and *Strong Beere*, by Putting in ſome like *Subſtances*, while they worke; Which may make them both to *Fume* leſſe, and to *Inflame* leſſe.

It

IT is conceiued by ſome, (not improbably,) that the reaſon, why *Wilde-Fires*, (whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the firſt *Concretion* of *Bitumen* is a *Mixture* of a *Fiery*, and *Watry Subſtance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court* of *Vulcan*, you ſhall heare, vnder the *Earth*, a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth alſo *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Ætna*, and *Veſuuius*, and the like, which conſiſt vpon *Sulphur*, ſhoot forth *Smoake*, and *Aſhes*, and *Pumice*, but no *water*. It is reported alſo, that *Bitumen* Mingled with *Lime*, and Put vnder *Water*, will make, as it were, an *Artificiall Rocke*; The *Subſtance* becommeth ſo Hard.

Experiment Solitary touching the *Materials* of *Wilde-Fire*. 783

THere is a *Cement* compounded of *Flowre*, *whites* of *Egges*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piſcina mirabilis*, neare *Cuma*, is ſaid to haue the *Walls* Plaſtered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *whites* of *Egges*, and *Gum-Dragon*, made into *Paſte*, will in a few dayes harden to the Hardneſſe of a *Stone*.

Experiment Solitary touching *Plaſter* growing as *Hard as Marble*. 784

IT hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or Hurts in the *Legs*, are Hard to Cure; And in the *Head* more Eaſie. The *Cauſe* is, for that *Vlcers* or *Hurts* in the *Legs* require *Deſiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwiſe *Drineſſe* maketh them more apt to Conſolidate. And in Moderne Obſeruation, the like difference hath beene found, betweene *French-Men*, and *Engliſh-Men*; Whereof the ones *Conſtitution* is more *Drie*, and the others more *Moiſt*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *Engliſh-Man*.

Experiment Solitary touching *Iudgement* of the *Cure* in ſome *Vlcers* and *Hurts*. 785

IT hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cauſe a *Feauourous Diſpoſition* of the *Teare*; But with *Raine*, not. The *Cauſe* is, for that *Southerne Winds* doe, of themſelues, qualifie the *Aire*, to be apt to cauſe *Feuers*; But when *Showers* are ioyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coaſts*, becauſe the *Vapour* of the *Sea*, without *Showers*, doth refreſh.

Experiment Solitary touching the *Healthfulneſſe* or *Vnhealthfulneſſe* of the *Southerne Wind*. 786

IT hath beene noted by the *Ancients*, that *wounds* which are made with *Braſſe*, heale more eaſily, than *wounds* made with *Iron*. The *Cauſe* is, for that *Braſſe* hath, in it ſelfe, a *Sanative Vertue*; And ſo in the very Inſtant helpeth ſomewhat: But *Iron* is *Corroſiue*, and not *Sanatiue*. And therefore it were good, that the Inſtruments which are vſed by *Chirurgians* about wounds, were rather of *Braſſe*, than *Iron*.

Experiment Solitary touching *Wounds*. 787

Experiment Solitary touching *Mortification* by *Cold*. 788

IN the *Cold Countries*, when Mens *Noſes* and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a Fire, they rot off preſently. The *Cauſe* is, for that the few *Spirits*, that remaine in thoſe *Parts*, are ſuddenly drawne forth, and ſo *Putrifaction* is made Compleat. But *Snow* Put vpon them, helpeth; For that it preſerueth thoſe *Spirits* that remaine, till they can reuiue; And beſides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proued out of the *Text*; *Qui dat Niuem ſicut Lanam, Gelu ſicut Cineres ſpargit.* Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Froſt* did fret like *Aſhes*. *Warme Water* alſo doth good; Becauſe by little and little it openeth the Pores, without any ſudden Working vpon the *Spirits*. This *Experiment* may bee transferred vnto the *Cure* of *Gangrenes*, either Comming of themſelues, or induced by too much Applying of *Opiates*: Wherein you muſt beware of *Drie Heat*, and reſort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cheriſhing.

Experiment Solitary touching *Weight*. 789

WEigh *Iron*, and *Aqua Fortis*, ſeuerally; Then diſſolue the *Iron* in the *Aqua Fortis*: And weigh the *Diſſolution*; And you ſhall finde it to beare as good *Weight*, as the *Bodies* did ſeuerally: Notwithſtanding a good deale of Waſte, by a thicke *Vapour*, that iſſueth during the *Working*: Which ſheweth that the opening of a *Body*, doth increaſe the *Weight*. This was tried once, or twice, but I know not, whether there were any *Errour*, in the *Triall*.

Experiment Solitary touching the *Super-Natation* of *Bodies*. 790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-ſilver* two *Drachmes*; (For that Charge the *Aqua-Fortis* will beare;) The *Diſſolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increaſing of the *weight* of *Water*, will increaſe his *Power* of *Bearing*; As wee ſee *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Phyſitian*, that vſed to giue ſome Minerall *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe ſo eaſily, as in Ordinary *Water*. But it ſeemeth, the *weight* of the *Quick-ſilver*, more than the *Weight* of a *Stone*; doth not compenſe the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary touching the *Flying* of *Vnequall Bodies* in the *Aire*. 791

LEt there be a Body of *Vnequall Weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *weightier End* will recouer to be Forwards; Vnleſſe the *Body* be Ouer-long. The *Cauſe* is, for that the more *Denſe Body*, hath a more Violent *Preſſure* of the Parts, from the firſt *Impulſion*; Which is the *Cauſe*, (though heretofore not found out, as hath beene often ſaid,) of all *Violent Motions*: And when the *Hinder Part* moueth ſwifter, (for that it leſſe endureth *Preſſure* of *Parts*,) than the *Forward Part* can make way for it, it muſt needs be, that the *Body* turne ouer: For (turned) it can more eaſily draw forward the *Lighter* Part. *Galilæus* noteth it well; That if an *Open Trough*, wherein *water* is, be driuen faſter than the *water*

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can follow, the *Water* gathereth vpon an heape, towards the *Hinder End*, where the *Motion* began; Which he ſuppoſeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cauſe* of the *Ebbing* and *Flowing* of the *Ocean*; Becauſe the *Earth* ouer-runneth the *Water*. Which *Theory*, though it be falſe, yet the firſt *Experiment* is true. As for the *Inequality* of the *Preſſure* of *Parts*, it appeareth manifeſtly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the ſame *Magnitude*, and *Shape*, and throw them with equall Force, you cannot poſſibly throw the *Wood*, ſo farre, as the *Stone*, or *Iron*.

IT is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you daſh a *Stone* againſt a *Stone* in the *Bottome* of the *Water*, it maketh a *Sound*. So a long *Pole* ſtrucke vpon *Grauell*, in the *Bottome* of the *Water*, maketh a *Sound*. Nay, if you ſhould thinke that the *Sound* commeth vp by the *Pole*, and not by the *Water*, you ſhall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solid *Body*, whereby the *Sound* can aſcend.

Experiment Solitary touching *Water*, that it may bee the *Medium* of *Sounds*.

792

ALL *Obiects* of the *Senſes*, which are very *Offenſiue*, do cauſe the *Spirits* to retire; And vpon their *Flight*, the *Parts* are (in ſome degree) deſtitute; And ſo there is induced in them a *Trepidation* and *Horrour*. For *Sounds*, we ſee that the *Grating* of a *Saw*, or any very *Harſh Noiſe*, will ſet the *Teeth* on edge, and make all the *Body* Shiuer. For *Taſtes*, we ſee that in the Taking of a *Potion*, or *Pils*, the *Head* and the *Necke* ſhake. For *Odious Smels*, the like Effect followeth, which is leſſe perceiued, becauſe there is a Remedy at hand, by Stopping of the *Noſe*: But in *Horſes*, that can vſe no ſuch Helpe, we ſee the *Smell* of a *Carrion*, eſpecially of a *Dead Horſe*, maketh them flie away, and take on, almoſt as if they were Mad. For *Feeling*, if you come out of the *Sunne*, ſuddenly, into a *Shade*, there followeth a *Chilneſſe*, or *Shiuering* in all the *Body*. And euen in *Sight*, which hath (in effect) no *Odious Obiect*, Comming into *Sudden Darkneſſe*, induceth an *Offer* to *Shiuer*.

Experiment Solitary of the *Flight* of the *Spirits* vpon *Odious Obiects*.

793

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windowes only from aboue: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neere Fifty; Hauing a *Doore* in the Middeſt. It reporteth the *Voice*, twelue, or thirteene times, if you ſtand by the Cloſe *End-wall*, ouer againſt the *Doore*. The *Eccho* fadeth and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* ſoundeth, as if it came from aboue the *Doore*. And if you ſtand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you ſtand in the *Doore*, or in the *Middeſt* iuſt ouer againſt the *Doore*, not. Note that all *Eccho's* ſound better againſt *Old Wals*, than *New*; Becauſe they are more *Dry* and *Hollow*.

Experiment Solitary touching the *Super-Reflection* of *Eccho's*.

794

Experiment Solitary touching the *Force of Imagination, Imitating* that of the *Sense*. 795

THose *Effects*, which are wrought by the *Percussion* of the *Sense*, and by *Things* in *Fact*, are produced likewise in some degree, by the *Imagination*. Therefore if a Man see another eat *Sowre* or *Acide Things*, which set the *Teeth* on edge, this *Obiect* ***tainteth*** the *Imagination*. So that he that seeth the *Thing* done by another, hath his owne *Teeth* also set on edge. So if a Man see another turne swiftly, and long; Or if hee looke vpon *wheeles* that turne, Himselfe waxeth *Turne-sicke*. So if a Man bee vpon an *High Place*, without *Railes*, or good Hold, except he be vsed to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many vpon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themselues are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment Solitary touching *Preseruation* of *Bodies*. 796

TAke a *Stock-Gilly-Flower*, and tie it gently vpon a Sticke, and put them both into a *Stoop-Glasse*, full of *Quick-siluer*, so that the *Flower* be couered: Then lay a little *Weight* vpon the Top of the *Glasse*, that may keepe the Sticke downe; And look vpon them after foure or fiue daies; And you shall finde the *Flower* Fresh, and the *Stalke* Harder, and lesse *Flexible* than it was. If you compare it with another *Flower*, gathered at the same time, it will be the more manifest. This sheweth, that *Bodies* doe preserue excellently in *Quick-siluer*, And not preserue only, but, by the *Coldnesse* of the *Quick-siluer*, *Indurate*; For the *Freshnesse* of the *Flower* may be meerely *Conseruation*; (which is the more to be obserued, because the *Quicksiluer* presseth the *Flower*;) But the *Stiffenesse* of the *Stalke* cannot be without *Induration*, from the Cold (as it seemeth,) of the *Quick-siluer*.

Experiment Solitary touching the *Growth*, or *Multiplying* of *Metals*. 797

IT is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the *Ground*, if it be well *Watred*, will increase into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increase; As hath beene seene in *Old Statua's* of *Stone*, which haue beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time) there appeared, that the *Lead* did swell; Insomuch as it hanged vpon the *Stone* like *Warts*.

Experiment Solitary touching the *Drowning* of the *more Base Metall* in the *more Precious*. 798

I Call *Drowning* of *Metals*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no meanes be separated againe: which is a kinde of *Version*, though False: As if *Siluer* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Siluer*. The Ancient *Electrum* had in it a Fifth of *Siluer* to the *Gold*; And made a *Compound Metall*, as fit for most vses, as *Gold*; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe priuily, or to make the *Compound* passe for the *Rich Mettall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done Auowedly, and without Disguizing, it may be a great *Sauing* of

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the *Richer Metall*. I remember to haue heard of a Man, skilfull in *Metals*, that a Fifteenth Part of *Siluer*, incorporate with *Gold*, will not be Recouered by any *water* of *Separation*; Except you put a Greater *Quantitie* of *Siluer*, to draw to it the Leſſe; which (he ſaid) is the laſt Refuge in *Separations*. But that is a tedious way, which no Man (almoſt) will thinke on. This would be better enquired; And the *Quantitie* of the Fifteenth turned to a Twentieth; And likewiſe with ſome little *Additionall*, that may further the *Intrinſique Incorporation*. Note that *Siluer* in *Gold* will be detected by *weight*, compared with the *Dimenſion*; But *Lead* in *Siluer*, (*Lead* being the *weightier Metall*,) will not bee detected; If you take ſo much the more *Siluer*, as will counteruaile the *Ouer-weight* of the *Lead*.

Experiment Solitary touching *Fixation* of *Bodies*. 799

Gold is the only *Subſtance*, which hath nothing in it *Volatile*, and yet melteth without much difficulty. The *Melting* ſheweth that it is not Ieiune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Cloſe Coaceruation* of them: Whereby they haue the leſſe Appetite, and no meanes (at all) to iſſue forth. It were good therefore to try, whether *Glaſſe Re-Moulten* doe leeſe any *Weight*? For the *Parts* in *Glaſſe* are euenly Spred; But they are not ſo Cloſe as in *Gold*; As wee ſee by the Eaſie Admiſſion of *Light*, *Heat*, and *Cold*; And by the *Smalneſſe* of the *Weight*. There bee other *Bodies*, *Fixed*, which haue little or no *Spirit*: So as there is nothing to fly out; As wee ſee in the *Stuffe*, whereof *Copples* are made; Which they put into *Furnaces*; Vpon which *Fire* worketh not: So that there are three *Cauſes* of *Fixation*; The Euen *Spreading* both of the *Spirits*, and *Tangible Parts*; The *Cloſeneſſe* of the *Tangible Parts*; And the *Ieiuneneſſe* or *Extreme Comminution* of *Spirits*: Of which Three, the Two Firſt may be ioyned with a *Nature Liquefiable*; The Laſt not.

Expetiment Solitary touching the *Reſtleſſe Nature* of Things in *Themſelues*, and their *Deſire* to *Change*. 800

IT is a Profound *Contemplation* in *Nature*, to conſider of the *Emptineſſe* (as we may call it) or *Inſatisfaction* of ſeuerall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smels*, and *Vapours*; And it is moſt manifeſt, that it doth it, with a kinde of Thirſt, as not ſatisfied with his owne former Conſiſtence; For elſe it would never receiue them in ſo ſuddenly, and eaſily. *Water* and all *Liquors*, doe haſtily receiue *Dry* and more *Terreſtriall Bodies*, Proportionable: And *Dry Bodies*, on the other ſide, drinke in *Waters*, and *Liquors*: So that, (as it is well ſaid, by one of the *Ancients*, of *Earthly* and *watry Subſtances*,) *One is a Glue to another*. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquors*, though themſelves be *Entire Bodies*, and not *Comminuted*, as *Sand* and *Aſhes*; Not apparently Porous: *Metals* themſelves doe receiue in readily *Strong-Waters*; And *Strong-Waters* likewiſe doe readily pierce into *Metals*, and *Stones*: And that *Strong-water* will touch vpon *Gold*, that will not touch vpon *Siluer*; And *è conuerſo*. And *Gold*,

which ſeemeth by the *weight* to bee the Cloſeſt, and moſt Solid *Body*, doth greedily drinke in *Quick-Siluer*. And it ſeemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Conſent. Of the *Cauſe* of this, and to what *Axiome* it may be referred, conſider attentiuely; For as for the Prettie Aſſertion, that *Matter* is like a *Common Strumpet*, that deſireth all *Formes*, it is but a *Wandring Notion*. Onely *Flame* doth not content it ſelfe to take in any other *Body*; But either, to ouercome and turne another *Body* into it Selfe, as by Victorie; Or it Selfe to dye, and goe out.

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NATVRALL HISTORIE.

IX. Century.

IT is certaine, that all *Bodies* whatſoeuer, though they haue no *Senſe*, yet they haue *Perception*: For when one *Body* is applied to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* bee *Alterant*, or *Altered*, euermore a *Perception* precedeth *Operation*: For elſe all *Bodies* would be alike One to Another. And ſometimes this *Perception* in ſome Kinde of *Bodies*, is farre more Subtill than the *Senſe*; So that the *Senſe* is but a dull Thing in Compariſon of it: Wee ſee a *Weather-Glaſſe*, will finde the leaſt difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* alſo, is ſometimes at *Diſtance*, as well as vpon the *Touch*; As when the *Load-Stone* draweth *Iron*; or

Experiments in Conſort, touching *Perception* in *Bodies Inſenſible*, tending to *Natural Diuination*, or *Subtill Trialls*.

Flame fireth *Naphtha* of *Babylon*, a great diſtance off. It is therfore a *Subiect* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Senſe*; And ſometimes Better. And beſides, it is a Principall *Meanes* of *Naturall Diuination*, For that which in theſe *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true alſo, that it ſerueth to *diſcouer* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to try whether *Seeds* be old, or new, the *Senſe* cannot informe: But if you boile them in *Water*, the New *Seeds* will ſprout ſooner: And ſo of *Water*, the *Taſte* will not diſcouer the beſt *Water*; But the *Speedy Conſuming* of it, and many other *Meanes* which we haue heretofore ſet downe, will diſcouer it. So in all *Phyſiognomy*, the *Lineaments* of the *Body* will diſcouer thoſe *Naturall Inclinations* of the *Minde*, which *Diſſimulation* will conceale, or *Diſcipline* will ſuppreſſe. Wee ſhall therefore now handle only, thoſe two *Perceptions*, which pertaine to *Naturall Diuination*, and *Diſcouery*: Leauing the Handling of *Perception* in other Things to be diſpoſed Elſewhere. Now it is true, that *Diuination* is attained by other *Meanes*; As if you know the *Cauſes*; If you know the *Concomitants*; you may iudge of the *Effect* to follow: And the like may be ſaid of *Diſcouery*; But we tie our Selues here, to that *Diuination* and *Diſcouery* chiefly, which is Cauſed by an *Early*, or *Subtill Perception*.

The *Aptneſſe* or *Propenſion* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breakeforth into manifeſt *Effects* of *Diſeaſes*, *Blaſtings*, or the like. Wee will therefore ſet downe ſome *Prognoſticks* of *Peſtilentiall* and *Vnwholeſome Yeares*.

801 The *wind* blowing much from the *South*, without *Raine*; And *wormes* in the *Oake-Apple*; haue beene ſpoken of before. Alſo the *Plenty* of *Frogs*, *Graſhoppers*, *Flies*, and the like *Creatures* bred of *Putrifaction*, doth portend *Peſtilentiall Yeares*.

802 *Great*, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the ſame; And generally ſo doe *Yeares* with little *wind*, or *Thunder*.

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Great Droughts in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showers* vpon them; And then some *Drie Weather* againe; Doe portend a *Pestilent Summer*, the *Yeare* following: For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees* is exhaled; (And much more if the *August* be drie,) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire*: And that *Vapour*, by the first *Showers*, if they be *Gentle*, is released, and commeth forth abundantly,. Therefore they that come abroad soone after those *Showers*, are commonly taken with *Sickenesse*: And in *Affricke*, no Bodie will stirre out of doores, after the first *Showers*. But if the *Showers* come vehemently, then they rather wash and fill the *Earth*, than giue it leaue to breathe forth presently. But if *Dry Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, vpon the first *Showers* begun; And maketh it of ill *Influence*, euen to the Next *Summer*; Except a very *Frosty Winter* discharge it, Which seldome succeedeth such *Drought*. 803

The *Lesser Infections*, of the *Small Pockes*, *Purple Feuers*, *Agues*, in the *Summer Precedent*, and houering all *Winter*, doe portend a great *Pestilence* in the *Summer* following; For *Putrifaction* doth not rise to his heighth at once. 804

It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire*; And if it Putrifie quickly, it is a *Signe* of a *Disposition* in the *Aire* to *Putrifaction*. And because you cannot be informed, whether the *Putrifaction* be quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amisse, in the same *Yeare*, and at the same *Time*, to lay one *Peece* of *Flesh*, or *Fish*, in the *Open Aire*, and another of the same Kinde and Bignesse, within *Doores*: For I iudge, that if a generall *Disposition* be in the *Aire* to Putrifie, the *Flesh*, or *Fish*, will sooner Putrifie abroad, where the *Aire* hath more power, than in the *House*, where it hath lesse, being many wayes corrected. And this *Experiment* would be made about the *End* of *March*: For that *Season* is likest to discouer, what the *Winter* hath done; And what the *Summer* following will doe vpon the *Aire*. And because the *Aire* (no doubt) receiueth great *Tincture*, and *Infusion* from the *Earth*; It were good to trie that *Exposing* of *Flesh*, or *Fish*, both vpon a *Stake* of *wood*, some heighth aboue the *Earth*, and vpon the *Flat* of the *Earth*. 805

Take *May-Dew*, and see whether it putrifie quickly, or no? For that likewise may disclose the *Qualitie* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*. 806

A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there be a *Showring Aprill* betweene: But otherwise, it is a *Signe* of a *Pestientiall Yeare*. 807

As the *Discouery* of the *Disposition* of the *Aire*, is good for the *Prognostickes* of *Wholesome*, and *Vnwholesome Yeares*; So it is of much more vse, for the *Choice* of *Places* to dwell in: At the least, for *Lodges*, and *Retiring Places* for *Health*; (For *Mansion Houses* respect *Prouisions*, as well 808

as

as *Health*; Wherein the *Experiments* aboue mentioned may ſerue.

809 But for the *Choice* of *Places*, or *Seats*, it is good to make Triall, not onely of *Aptneſſe* of *Aire* to corrupt, but alſo of the *Moiſture* and *Drineſſe* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diuerſly. We ſee that there be ſome *Houſes*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainſcots* will alſo ſweat more; ſo that they will almoſt run with *Water*: All which, (no doubt,) are cauſed chiefly by the *Moiſtneſſe* of the *Aire*, in thoſe *Seats*. But becauſe it is better to know it, before a *Man* buildeth his *Houſe*, than to finde it after, take the *Experiments* following.

810 Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would try, comparing it with ſome other *Places*; And ſee whether it doth not moiſten, and make the *Wooll*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may iudge of that Place, as Situate in a *Groſſe*, and *Moiſt Aire*.

811 Becauſe it is certaine, that in ſome *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Vnequall, than in Others; And *Inequality* of *Aire* is euer an Enemy to *Health*; It were good to take two *Weather-Glaſſes*, Matches in all things, and to ſet them for the ſame Houres of One day, in ſeuerall *Places* where no *Shade* is, nor *Encloſures*: And to marke when you ſet them, how farre the *Water* commeth; And to compare them, when you come againe, how the *Water* ſtandeth then: and if you finde them *Vnequall*, you may be ſure that the *Place* where the *Water* is loweſt, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequality* bee, of the *Aſcent*, or *Deſcent* of the *Water*, the greater is the *Inequality* of the *Temper* of the *Aire*.

812 The *Predictions* likewiſe of *Cold* and *Long Winters*, and *Hot* and *Dry Summers*, are good to be knowne; As well for the *Diſcouery* of the *Cauſes*, as for diuers *Prouiſions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene ſpoken of before. If *Wainſcot*, or *Stone*, that haue vſed to Sweat, be more dry, in the Beginning of *Winter*; Or the *Drops* of the *Eaues* of *Houſes* come more ſlowly downe, than they vſe; it portendeth a *Hard*, and *Froſty Winter*. The *Cauſe* is, For that it ſheweth an *Inclination* of the *Aire*, to *Dry Weather*; which in *Winter* is euer ioyned with *Froſt*.

813 Generally, a *Moiſt* and *Coole Summer*, portendeth a *Hard Winter*. The *Cauſe* is, for that the *Vapours* of the *Earth*, are not diſſipated in the *Summer* by the *Sunne*; And ſo they rebound vpon the *Winter*.

814 A *Hot* and *Dry Summer*, and *Autumne*, and eſpecially if the *Heat* and *Drought* extend farre into *September*, portendeth an Open Beginning of *Winter*; And *Colds* to ſucceed, toward the latter Part of the *Winter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; And the *Vapours* are not ſufficiently Multiplied.

815 An *Open* and *Warme Winter* portendeth a *Hot* and *Dry Summer*: For the *Vapours* diſperſe into the *Winter Showers*; Whereas *Cold* and *Froſt* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

816 *Birds* that vse to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *Weather*, according to that *Countrey* whence they came: As the *Winter-Birds*, (namely *Woodcockes*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with vs shew *Cold Winters*. And if it be in the same *Countrey*, then they shew a *Temperature* of *Season*, like vnto that *Season* in which they come: As *Swallowes*, *Bats*, *Cuckooes*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

817 The *Prognosticks*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* vpon the *Shoare*, And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*; shew *Wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceiued, except they bee pent, by *Water*, or *wood*. And therefore a *Murmur* out of *Caues* likewise portendeth as much.

818 The *Vpper Regions* of the *Aire*, perceiue the *Collection* of the *Matter* of *Tempest*, and *winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

819 *Great Mountaines* haue a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *Wales*, when certaine *Hills* haue their *Night-Caps* on, they meane Mischiefe. The *Cause* is, for that *Tempests*, which are for the most Part bred aboue, in the *Middle Region*, (as they call it,) are soonest perceiued to collect in the *Places* next it.

820 The *Aire*, and *Fire*, haue *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discouer a *Wind* that otherwise wee doe not feele; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be vnquiet; And so doe *Coales* of *Fire* by Casting off the *Ashes* more than they vse. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driuen the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to moue, than *Aire*: And for the *Ashes*, it is no maruell, though *Wind* unperceiued shake them off; For wee vsually trie, which way the *Wind* bloweth, by casting vp *Grasse*, or *Chaffe*, or such light Things, into the *Aire*.

821 When *Wind* expireth from vnder the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceiued by the *Sense*, vntill there bee an *Eruption* of a great *Quantitie*, from vnder the *Water*; And so it getteth into a *Bodie*: Whereas in the first *Putting vp* it commeth in little Portions.

822 We spake of the *Ashes*, that *Coales*, cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moueth, when we finde no *Wind*,

wind, sheweth a *Wind* at hand; As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*.

For *Prognostickes* of *Weather* from *Liuing Creatures*, it is to be noted; That *Creatures* that Liue in the *Open Aire*, (*Sub Diô*,) must needs haue a Quicker *Impression* from the *Aire*, than *Men* that liue most within *Doores*; And especially *Birds*, who liue in the *Aire*, freest, and cleerest; And are aptest by their *Voyce* to tell Tales, what they finde; And likewise by the *Motion* of their *Flight* to expresse the same.

823 *Water-Fowles*, (as *Sea-Gulls*, *More-Hens*, &c.) when they flocke and fly together, from the *Sea* towards the *Shoares*, And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *waters* with their *wings*; doe fore-shew *Raine*, and *wind*. The *Cause* is, *Pleasure*, that both Kindes take in the *Moistnesse*, and *Densitie* of the *Aire*: And so desire to be in *Motion*, and vpon the *wing*, whither soever they would otherwise goe: For it is no Maruell, that *Water-Fowle* doe ioy most in that *Aire*, which is likest *water*; And *Land-Birds* also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call upon *Raine*: All which is but the Comfort they seeme to receiue in the *Relenting* of the *Aire*.

824 The *Heron*, when shee soareth high, (so as sometimes shee is seene to passe ouer a *Cloud*,) sheweth *winds*: But *Kites* flying aloft, shew *Faire* and *Drie weather*. The *Cause* may bee, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heauie of *wing*, needeth the Helpe of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, shee delighteth in the *Fresh Aire*; And (many times) flyeth against the *wind*; As *Trouts*, and *Salmons* swimme against the Streame. And yet it is true also, that all *Birds* finde an Ease in the depth of the *Aire*; As *Swimmers* doe in a Deepe *water*. And therefore when they are aloft, they can vphold themselues with their *wings Spred*, scarce mouing them.

825 *Fishes*, when they play towards the *Top* of the *water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Drie*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Drie*, will fly it, and *Swimme* Lower.

826 *Beasts* doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get vp betimes in the Morning, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Conneyes*, will feed hard before *Raine*: And a *Heifer*, will put vp his *Nose*, and snuffe in the *Aire*, against *Raine*.

The

827 The *Trifoile*, againſt *Raine*, ſwelleth in the *Stalke*, and ſo ſtandeth more vpright; For by *Wet*, *Stalkes* doe erect, and *Leaues* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Country People call the *Wincopipe*; Which if it open in the *Morning*, you may be ſure of a faire *Day* to follow.

828 Euen in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieue, either towards *Raine*, or towards *Froſt*: For the one maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we ſee both *Extremes* bring the *Gout*.

829 *Wormes*, *Vermine*, &c. doe fore-ſhew (likewiſe) *Raine*: For *Earth-wormes* will come forth, and *Moules* will caſt vp more, and *Fleas* bite more, againſt *Raine*.

830 *Solide Bodies* likewiſe fore-ſhew *Raine*. As *Stones*, and *Wainſcot*, when they *Sweat*: And *Boxes*, and *Pegs* of *Wood*, when they Draw, and *Winde hard*; Though the former be but from an outward Cauſe; For that the *Stone*, or *Wainſcot*, turneth and beateth backe the *Aire* againſt it ſelfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it ſelfe.

Experiment Solitary touching the *Nature* of *Appetite* in the *Stomach*.

831 *Appetite* is moued chiefly by Things that are *Cold*, and *Drie*: The *Cauſe* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth vpon Supply; And ſo is *Drineſſe*: And therefore all *Soure Things*, as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitriol*, &c.) prouoke *Appetite*. And the *Diſeaſe*, which they call *Appetitus Caninus*, conſiſteth in the *Matter* of an *Acide* and *Glaſſie Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is alſo moued by *Soure Things*; For that *Sowre Things*, induce a *Contraction* in the *Nerues*, placed in the *Mouth* of the *Stomach*; Which is a great *Cauſe* of *Appetite*. As for the *Cauſe*, why *Onions*, and *Salt*, and *Pepper*, in Baked Meats, moue *Appetite*, it is by *Vellication* of thoſe *Nerues*; For *Motion* whetteth. As for *Worme-wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitterneſſe*, they moue *Appetite* by *Abſterſion*. So as there be foure Principall *Cauſes* of *Appetite*; The *Refrigeration* of the *Stomach*, ioyned with ſome *Drineſſe*; *Contraction*; *Vellication*; And *Abſterſion*: Beſides *Hunger*, which is an *Emptineſſe*: And yet *Ouer-Faſting* doth (many times) cauſe the *Appetite* to ceaſe; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And ſuch *Humours* as are Light, and Choleticke, which quench *Appetite* moſt.

Experiment Solitary touching *Sweetneſſe* of *Odour* from the *Raine-bow*.

832 IT hath beene obſerued by the *Ancients*, that where a *Rain-Bow*, ſeemeth to hang ouer, or to touch, there breatheth forth a *Sweet Smell*. The *Cauſe* is, for that this happeneth but in certaine Matters, which haue in themſelues ſome *Sweetneſſe*; Which the *Gentle Dew* of the *Rain-Bow* doth draw forth: And the like doe *Soft Showers*; For they alſo make the *Grounds* Sweet: But none are ſo delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be alſo, that the *Water* it ſelfe hath ſome *Sweetneſſe*: For the *Rain-Bow* conſiſteth of a *Gloweration* of *Small Drops*, which cannot poſſibly fall, but from the *Aire*, that is very *Low*: And there-

therefore may hold the very *Sweetneſſe* of the *Herbs*, and *Flowers*, as a *Diſtilled water*: For *Raine*, and other *Dew*, that fall from high, cannot preſerue the Smell, being diſſipated in the drawing vp: Neither doe we know, whether ſome *water* it ſelfe, may not haue ſome degree of *Sweetneſſe*. It is true that we finde it ſenſibly in no *Poole*, *Riuer*, nor *Fountaine*; But good *Earth*, newly turned vp, hath a *Freſhneſſe*, and good *Sent*; Which *Water*, if it be not too *Equall*, (For *Equall Obiects* neuer moue the *Senſe*,) may alſo haue. Certaine it is, that *Bay-Salt*, which is but a kinde of *water Congealed*, will ſometimes ſmell like *Violets*.

Experiment Solitary touching *Sweet Smells*.

833

TO *Sweet Smells Heat* is requiſite, to Concoct the *Matter*; And ſome *Moiſture* to Spread the *Breath* of them. For *Heat*, we ſee that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moiſture*, we ſee that things too much Dried, loſe their *Sweetneſſe*: And *Flowers* growing, ſmell better in a *Morning*, or *Euening*, than at *Noone*. Some *Sweet Smells* are deſtroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that haue *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*, As *Roſe-Water*, &c. Some doe ſcarce come forth, or at leaſt not ſo pleaſantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Encloſed in a *Faſt Body*: But (generally) thoſe *Smells* are the moſt Gratefull, where the degree of *Heat* is Small; Or where the *Strength* of the *Smell* is allayed; For theſe *Things* doe rather woope the *Senſe*, than Satiate it. And therefore the *Smell* of *Violets*, and *Roſes*, exceedeth in *Sweetneſſe* that of *Spices*, and *Gummes*; And the Strongeſt Sort of *Smells*, are beſt in a weſt, a farre off.

Experiment Solitary touching the *Corporeall Subſtance* of *Smells*.

834

IT is certaine, that no *Smell* iſſueth, but with *Emiſſion* of ſome *Corporeall Subſtance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we ſee plainly, that *Smell* doth ſpread nothing that diſtance, that the other doe. It is true, that ſome *Woods* of *Orenges*, and *Heathes* of *Roſe-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, ſince a *Peale* of *Ordnance* will doe as much, which moueth in a ſmall compaſſe? Whereas thoſe *Woods*, and *Heathes*, are of Vaſt Spaces: Beſides wee ſee that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloues*, &c. which ſheweth them *Corporeall*; And doe Laſt a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary touching *Fetide* and *Fragrant Odours*.

835

THe *Excrements* of moſt *Creatures* Smell ill; Chiefly to the ſame *Creature* that voideth them: For we ſee, beſides that of *Man*, that *Pigeons* and *Horſes* thriue beſt, if their *Houſes* and *Stables* be kept Sweet; And ſo of *Cage-Birds*: And the *Cat* burieth that which ſhee voydeth: And it holdeth chiefly in thoſe *Beaſts*, which feed vpon *Fleſh*. *Dogs* (almoſt) onely of *Beaſts*, delight in *Fetide Odours*; Which ſheweth there is ſomewhat in their *Senſe* of *Smell*, differing from the *Smells* of other *Beaſts*. But the *Cauſe*, why *Excrements* ſmell ill, is manifeſt; For that the

Body

Body it ſelfe reiected them; Much more the *Spirits*: And we ſee, that thoſe *Excrements*, that are of the *Firſt Digeſtion*, Smell the worſt; As the *Excrements* from the *Belly*: Thoſe that are from the *Second Digeſtion*, leſſe ill; As *Vrine*; And thoſe that are from the *Third*, yet leſſe, For *Sweat* is not ſo bad, as the other two; Eſpecially of ſome *Perſons*, that are full of *Heat*. Likewiſe moſt *Putrifactions* are of an *Odious Smell*: For they ſmell either *Fetide*, or *Mouldy*. The *Cauſe* may be, for that *Putrifaction* doth bring forth ſuch a *Conſiſtence*, as is moſt Contrary to the *Conſiſtence* of the *Body*, whilſt it is Sound: For it is a meere diſſolution of that *Forme*. Beſides, there is another Reaſon which is Profound: And it is that the *Obiects* that pleaſe any of the *Senſes*, haue (all) ſome *Equality*, and (as it were) *Order*, in their *Compoſition*: But where thoſe are wanting, the *Obiect* is euer Ingrate. So *Mixture* of many *Diſagreeing Colours* is euer vnpleaſant to the *Eye*; *Mixture* of *Diſcordant Sounds* is vnpleaſant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Taſtes*, is vnpleaſant to the *Taſte*: *Harſhneſſe* and *Ruggedneſſe* of *Bodies*, is vnpleaſant to the *Touch*: Now it is certaine, that all *Putrifaction*, being a *Diſſolution* of the firſt *Formie*, is a meere *Confuſion*, and *Vnformed Mixture* of the *Part*. Neuertheleſſe it is ſtrange, and ſeemeth to Croſſe the former *Obſeruation*, that ſome *Putrifactions* and *Excrements* doe yeeld *Excellent Odours*; As *Ciuet* and *Muske*; And as ſome thinke *Amber-Greece*: For diuers take it, (though vnprobably) to come from the *Sperme* of *Fiſh*: And the *Moſſe* we ſpake of from *Apple-Trees*, is little better than an *Excretion*. The Reaſon may be, for that there paſſeth in the *Excrements*, and remaineth in the *Putrifactions*, ſome good *Spirits*; eſpecially where they proceed from *Creatures*, that are very *Hot*. But it may be alſo ioyned with a further *Cauſe*, which is more Subtill; And it is, that the *Senſes* loue not to bee Ouerpleaſed; But to haue a *Commixture* of ſomewhat that is in it ſelfe Ingrate. Certainly, we ſee how *Diſcords* in *Muſicke*, falling vpon *Concords*, make the *Sweeteſt Straines*: And we ſee againe, what Strange *Taſtes* delight the *Taſte*; As *Red-Herrings*, *Caueary*, *Parmizan*, &c. And it may be, the ſame holdeth in *Smels*. For thoſe kinde of *Smels*, that we haue mentioned, are all Strong, and doe Pull and Vellicate the *Senſe*. And wee finde alſo, that *Places* where Men *Vrine*, commonly haue ſome *Smell* of *Violets*: And *Vrine*, if one hath eaten *Nutmeg*, hath ſo too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Coniugations*; Of the *Influences* of *Heauen*; Of *Heat*, *Cold*, *Moiſture*, *Drought*; *Qualities Actiue*, *Paſſiue*; And the like; haue ſwallowed vp the true *Paſſages*, and *Proceſſes*, and *Affects*, and *Conſiſtences* of *Matter*, and *Naturall Bodies*. Therefore they are to be ſet aſide, being

but *Notionall*, and *ill Limited*; And Definite *Axiomes* are to be drawne out of *Meaſured Inſtances*: And ſo Aſſent to bee made to the more *Generall Axiomes*, by *Scale*. And of theſe Kindes of *Proceſſes* of *Natures* and *Characters* of *Matter*, we will now ſet downe ſome *Inſtances*.

Experiment Solitary, touching the *Cauſes* of *Putriſaction*. 836

ALL *Putriſaction* come chiefly from the *Inward Spirits* of the *Body*; And partly alſo from the *Ambient Body*, be it *Aire*, *Liquor*, or whatſoeuer elſe. And this laſt, by two *Meanes*: Either by *Ingreſſe* of the *Subſtance* of the *Ambient Body*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Receiued Opinion, that *Putriſaction* is cauſed, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but Nugation: For *Cold* in *Things Inanimate*, is the greateſt Enemy that is, to *Putriſaction*, though it extinguiſheth *Viuification*, which euer conſiſteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Aduentiue Heat*, be greatly Predominant, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Diſſolution*, or Notable *Alteration*. But this is wrought by *Emiſſion*, or *Suppreſſion*, or *Suffocation*, of the *Natiue Spirits*; And alſo by the *Diſordination*, and *Diſcompoſture* of the *Tangible Parts*; And other *Paſſages* of *Nature*; And not by a *Conflict* of *Heats*.

Experiment Solitary touching *Bodies Vnperfectly Mixt*. 837

IN *Verſions* or *Maine Alterations* of *Bodies*, there is a *Medium* betweene the *Body*, as it is at firſt, and the *Body Reſulting*; which *Medium* is *Corpus imperfectè Miſtum*, and is Tranſitory, and not durable; As *Miſts*, *Smoaks*, *Vapours*, *Chylus* in the *Stomach*, *Liuing Creatures* in the firſt *Viuification*: And the *Middle Action*, which produceth ſuch *Imperfect Bodies*, is fitly called (by ſome of the *Ancients*) *Inquination*, or *Inconcoction*, which is a Kinde of *Putriſaction*; For the *Parts* are in *Confuſion*, till they ſettle one way, or other.

Experiment Solitary touching *Concoction* and *Crudity*. 838

THE word *Concoction*, or *Digeſtion*, is chiefly taken into vſe from *Liuing Creatures* and their *Organs*; And from thence extended to *Liquors*, and *Fruits*, &c. Therefore they ſpeake of *Meat Concocted*, *Vrine* and *Excrements Concocted*; And the *Foure Diſgeſtions*, (In the *Stomach*; In the *Liuer*; In the *Arteries* and *Nerues*; And in the *Seuerall Parts* of the *Body*;) are likewiſe called *Concoctions*: And they are all made to bee the Workes of *Heat*: All which *Notions* are but ignorant Catches of a few Things, which are moſt Obuious to *Mens Obſeruations*. The Conſtanteſt *Notion* of *Concoction* is, that it ſhould ſignifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to perfect *Concoction*; Which is the *Vltimity* of that *Action* or *Proceſſe*: And while the *Body* to bee *Conuerted* and *Altered*, is too ſtrong for the *Efficient*, that ſhould *Conuert*, or *Alter* it, (whereby it reſiſteth and holdeth faſt in ſome degree the firſt

Forme,

Forme, or *Consistence*) it is (all that while) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Crudity* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conuersion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conuersion*, and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Liuing Creatures*; In which there is an *Absolute Conuersion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other (which is *Maturation*) is seene in *Liquors*, and *Fruits*; wherein there is not desired, nor pretended, an vtter *Conuersion*, but only an *Alteration* to that *Forme*, which is most sought, for *Mans* vse; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there be two Kindes of *Absolute Conuersions*; The one is, when a *Body* is conuerted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which we call *Assimilation*. The other is, when the *Conuersion* is into a *Body* meerely New, and which was not before; As if *Siluer* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conuersion* is better called, for distinctions sake, *Transmutation*.

THere are also diuers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoeuer doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Maior*: As when *Meat* is Boiled, or Roasted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheese* is made of Curds, or *Butter* of *Creame*, or *Coales* of Wood, or *Brickes* of Earth; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* vsed;) They be but Shifts of *Ignorance*; For *Knowledge* will be euer a *Wandring* and *Indigested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of Instances, and those well collated.

Experiment Solitary touching *Alterations*, which may bee called *Maiors*. 839

The *Consistences* of *Bodies* are very diuers: *Dense*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*; *Hard*, *Soft*; *Cleauing*, Not *Cleauing*; *Congealeable*, *Not Congealeable*; *Liquefiable*, Not *Liquefiable*; *Fragile*, *Tough*, *Flexible*, *Inflexible*; *Tractile*, or to be drawne forth in length, *Intractile*; *Porous*, *Solid*; *Equall*, and *Smooth*, *Vnequall*; *Venous*, and *Fi-*

 brous,

brous, and with *Graines*, *Entire*; And diuers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought*, is a Compendious and Inutile *Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylua Syluarum*: Neuertheleſſe in ſome good part, Wee ſhall handle diuers of them now preſently.

Experiment Solitary touching *Bodies Liquefiable, and not Liquefiable.* 840

Liquefiable, and *Not Liquefiable*, proceed from theſe *Cauſes*: *Liquefaction* is euer cauſed by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore ſuch *Bodies* as are more *Turgide* of *Spirit*; Or that haue their *Spirits* more *Straitly Impriſoned*; Or againe that hold them *Better Pleaſed*, and *Content*; are *Liquefiable*: For theſe three *Diſpoſitions* of *Bodies*, doe arreſt the *Emiſſion* of the *Spirits*. An Example of the firſt two *Properties* is in *Metals*; And of the Laſt in *Greaſe*, *Pitch*, *Sulphure*, *Butter*, *Wax*, &c. The *Diſpoſition* not to *Liquefie* proceedeth from the *Eaſie Emiſſion* of the *Spirits*, whereby the *Groſſer Parts* contract; And therefore, *Bodies Ieiune* of *Spirits*; Or which part with their *Spirits* more *willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, euen many of thoſe *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithſtanding *Soften*; As *Iron* in the Forge; And a *Sticke* bathed in Hot Aſhes, which thereby becommeth more Flexible. Moreouer, there are ſome *Bodies*, which doe *Liquefie*, or diſſolue by *Fire*; As *Metals*, *Wax*, &c. And other *Bodies*, which diſſolue in *Water*; As *Salt*, *Sugar*, &c. The *Cauſe* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cauſe* of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which deſire to receiue the *Liquour*. Againe, there are ſome *Bodies*, that diſſolue with both; As *Gumme*, &c. And thoſe be ſuch *Bodies*, as on the One Side haue good ſtore of *Spirit*; And on the other Side, haue the *Tangible Parts Indigent* of *Moiſture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter ſtimulateth the Parts to Receiue the *Liquour*.

Experiment Solitary touching *Bodies Fragile*, and *Tough.* 841

OF *Bodies*, ſome are *Fragile*; And ſome are *Tough*, and *Not Fragile*; And in the *Breaking*, ſome *Fragile Bodies* breake but where the *Force* is; Some ſhatter and fly in many Peeces. Of *Fragilty* the *Cauſe* is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And ſo *Fictile Earth* is more *Fragile* than *Crude Earth*; And *Dry Wood* than *Greene*. And the *Cauſe* of this *Vnaptneſſe* to *Extenſion*, is the Small *Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extenſion* or *Dilatation* of *Bodies*;) And it is euer Concomitant with *Poroſity*, and with *Drineſſe* in the *Tangible Parts*: *Contrariwiſe*, *Tough Bodies* haue more *Spirit*, and fewer *Pores*, and *Moiſter Tangible Parts*: Therefore wee ſee that *Parchment*, or *Leather* will ſtretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* ſcarcely.

ALL *Solid Bodies* consist of *Parts* of two seuerall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, plaine *Aire* that is gotten in; As in *Bodies Desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are euer the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensiue*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diuersity; As *Hot*, *Cold*, *Actiue*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as wee call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary touching the *Two Kinds* of *Pneumaticals* in *Bodies*. 842

THE *Conretion* of *Bodies* is (commonly) solued by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolued by *Heat*; *Salt*, and *Sugar*, which are Excocted by *Heat*, are Dissolued by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by Contrary *Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either Meanes, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it be Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them: As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in stead of Contracting; And sometimes Rift.

Experiment Solitary touching *Conretion*, and *Dissolution* of *Bodies*. 843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Leuenesse* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them not only *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Dry Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which euer helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *wax*, &c. But note that *Soft Bodies*, (as wee vse the word,) are of two *Kinds*; The one, that easily giueth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*; And therefore we see that *wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giueth Place: For you may not thinke, that in *Printing* of *wax*, the *wax* riseth vp at all; But only the *depressed Part* giueth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession*; As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they giue place (indeed) easily, but then they rise all ouer: Which is a False *Cession*; For it is in *Place* and not in *Body*.

Experiment Solitary touching *Hard* and *Soft Bodies*. 844

Experiment Solitary touching *Bodies Ductile*, and *Tenſile*.
845

ALL *Bodies Ductile*, and *Tenſile*, (as *Metals* that will be drawne into *wires*; *Wooll* and *Tow* that will be drawne into *Yarne*, or *Thred*) haue in them the *Appetite* of *Not Diſcontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet ſo, as not to *Diſcontinue* or forſake their owne *Body*. *Viſcous Bodies*, (likewiſe) as *Pitch*, *Wax*, *Bird-Lime*, *Cheeſe toaſted*, will draw forth, and rope. But the difference betweene *Bodies Fibrous*, and *Bodies Viſcous*, is Plaine; For all *Wooll*, and *Tow*, and *Cotton*, and *Silke*, (eſpecially raw *Silke*) haue, beſides their Deſire of *Continuance*, in regard of the *Tenuity* of their *Thred*, a *Greedineſſe* of *Moiſture*; And by *Moiſture* to ioyne and incorporate with other *Thred*; Eſpecially if there be a little *Wreathing*; As appeareth by the *Twiſting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And we ſee alſo, that *Gold* and *Silver Thred* cannot bee made without *Twiſting*.

Experiment Solitary touching other *Paſſions* of *Matter*, and *Characters* of *Bodies*.
846

THe *Differences* of *Impreſſible* and *Not Impreſſible*; *Figurable* and *Not Figurable*; *Mouldable* and *Not Mouldable*; *Sciſſile* and *Not Sciſſile*; And many other *Paſſions* of *Matter*, are *Plebeian Notions*, applied vnto the *Inſtruments* and *Vſes* which Men ordinarily practiſe; But they are all but the *Effects* of ſome of theſe *Cauſes* following; Which we will Enumerate without Applying them, becauſe that would bee too long. The Firſt is the *Ceſſion*, or not *Ceſſion* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the Outward *Bulke*, and not flying vp. The Second is the *Stronger* or *weaker Appetite*, in *Bodies*, to *Continuity*, and to flie *Diſcontinuitie*. The Third is the *Diſpoſition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it bee *Native Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The Seuenth is the *Emiſſion* or *Detention* of the *Spirits* in *Bodies*. the Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Concerne*, or *Diffuſed*. The Tenth is the *Denſitie*, or *Raritie* of the *Tangible Parts*. The Eleuenth is the *Equality* or *Inequality* of the *Tangible Parts*. The Twelfth is the *Diſgeſtion*, or *Crudity* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous* or *Mercuriall*, *Watrie* or *Oilie*, *Drie* and *Terreſtriall*, or *Moiſt* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, ſeeme to bee *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing*, of the *Tangible Parts*, in *Length*, or *Tranſuerſe*; (as it is in the *Warpe*, and the *Woofe* of *Textiles*;) *More Inward*, or *More Outward*; &c. The Fifteenth is the *Poroſity*, or *Imporoſity* betwixt the *Tangible Parts*; And the *Greatneſſe*, or *Smalneſſe* of the *Pores*. The Sixteenth is the *Collocation* and *Poſture* of the *Pores*. There may be more *Cauſes*; but theſe doe occurre for the Preſent.

Take

TAke *Lead*, and melt it, and in the middeſt of it, when it beginneth to congeale, make a little Dint, or Hole, and put *Quicke-ſiluer* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-ſiluer* will fix, and runne no more, and endure the Hammer. This is a Noble *Inſtance* of *Induration*, by *Conſent* of one *Body* with another; and *Motion* of *Excitation* to *Imitate*; For to aſcribe it only to the *Vapour* of *Lead*, is leſſe Probable. *Quære* whether the *Fixing* may be in ſuch a degree, as it will be Figured like other *Metalls*? For if ſo, you may make Workes of it for ſome purpoſes, ſo they come not neare the *Fire*.

Experiment Solitary touching *Induration by Sympathy*. 847

SVgar hath put downe the vſe of *Honey*; In ſo much as wee haue loſt thoſe *Obſeruations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. Firſt, it ſeemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Blood* iſſuing from the *Tree*: In ſo much as one of the *Antients* relateth, that in *Trebiſond*, there was *Honey* iſſuing from the *Box-Trees*, which made *Men* Mad. Againe, in Ancient time, there was a Kind of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*, And was not ſo Luſhious as Ours. They had alſo a *Wine* of *Honey*, which they made thus. They cruſhed the *Honey* into a great *Quantitie of Water*, and then ſtrained the *Liquor*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Veſſels*, for a ſmall time; And after tunned it into *Veſſels* of *wood*, and kept it for many yeares. They haue alſo, at this day, in *Ruſſia*, and thoſe *Notherne Countries*, *Mead Simple*, which (well made, and ſeaſoned) is a good wholeſome *Drink*, and very Cleare. They vſe alſo in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that wee haue loſt in *Honey*, there were brought in vſe a *Sugar-Mead*, (for ſo we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keepe it ſtale, as they vſe *Mead*; For certainly, though it would not be ſo *Abſterſiue*, and *Opening*, and *Solutiue* a *Drinke*, as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitiue*, and fit to be vſed in *Sharpe Diſeaſes*: For we ſee, that the vſe of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in ſuch Caſes.

Experiment Solitary touching *Honey* and *Sugar*. 848

IT is reported by the *Ancients*, that there was a Kind of *Steele*, in ſome places, which would poliſh almoſt as white and bright as *Siluer*. And that there was in *India* a Kind of *Braſſe*, which (being poliſhed) could ſcarce be diſcerned from *Gold*. This was in the *Naturall Vre*; But I am doubtfull, whether Men haue ſufficiently refined *Metalls*, which wee count *Baſe*; As whether *Iron*, *Braſſe*, and *Tin*, be refined to the Heighth? But when they come to ſuch a Fineneſſe, as ſerueth the ordinary vſe, they trie no further.

Experiment Solitary touching the *Finer Sort* of *Baſe Metalls*. 849

THere haue beene found certaine *Cements* vnder *Earth*, that are very Soft; And yet, taken forth into the *Sun*, harden as Hard as *Marble*:

There

Experiment Solitary touching *Cements* and *Quarries*. 850

There are alſo ordinary *Quarries* in *Sommerſet-Shire*, which in the *Quarry* cut ſoft to any Bigneſſe, and in the *Building* proue firme, and hard.

Experiment Solitary touching the *Altering* of the *Colour* of *Heires* and *Feathers*. 851

Liuing Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray* and *White*: As is ſeene in *Men*, though ſome Earlier, ſome Later,; In *Horſes*, that are Dappled, and turne *white*; In *Old Squirrels*, that turne *Griſly*; And many others. So doe ſome *Birds*; As *Cygnets*, from *Gray* turne *white*; *Hawkes*, from *Browne* turne more *white*: And ſome *Birds* there be, that vpon their *Moulting*, doe turne *Colour*; As *Robin Red-breſts*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* vpon the *Head*. The cauſe is, for that *Moiſture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drineſſe* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and ſo all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the moſt part,) wax *Hoare* later. Out of this Ground, a *Man* may deuiſe the *Meanes* of *Altering* the *Colour* of *Birds*; and the *Retardation* of *Hoare-Haires*. But of this ſee in the fifth *Experiment*.

Experiment Solitary touching the *Differences* of *Liuing Creatures*, *Male* and *Female*. 852

THe *Difference* between *Male* and *Female*, in ſome *Creatures*, is not to be diſcerned, otherwiſe than in the *Parts* of *Generation*: As in *Horſes* and *Mares*, *Dogges* and *Bitches*, *Doues He* and *She*, and others. But ſome differ in *Magnitude*, and that diuerſly; For in moſt the *Male* is the greater; As in *Man*, *Pheaſants*, *Peacocks*, *Turkey's*; and the like; And in ſome few, as in *Hawkes*, the *Female*. Some differ in the *Haire*; and *Feathers*, both in the *Quantity*, *Criſpation*, and *Colours* of them; As *He-Lions* are *Herſute*, and haue great *Maines*; The *She's* are ſmooth like *Cats*. *Bulls* are more *Criſpe* vpon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheaſant-Cocke*, and *Gold-finch-Cocke*, haue glorious and fine *Colours*; The *Henn's* haue not. Generally, the Hees in *Birds* haue the faireſt *Feathers*. Some differ in diuers *Features*; As *Buckes* haue *Hornes*, *Doe's* none; *Rammes* haue more *wreathed Hornes* than *Ewes*; *Cocks* haue great *Combes* and *Spurres*, *Hens* little or none; *Boares* haue great *Fangs*, *Sowes* much leſſe; The *Turky-Cocke* hath great and Swelling *Gills*, the *Hen* hath leſſe; *Men* haue generally Deeper and Stronger *Voices*, than *Women*. Some differ in *Faculties*; As the *Cockes* amongſt *Singing Birds*, are the beſt *Singers*. The Chiefe *Cauſe* of all theſe, (no doubt,) is, for that the *Males* haue more Strength of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures Males*, are like *Females*; And ſo are *Eunuchs*, and *Gelt Creatures* of all kindes, liker *Females*. Now *Heat* cauſeth *Greatneſſe* of *Growth*, generally, where there is *Moiſture* enough to worke vpon: But if there be found in any *Creature*, (which is ſeene rarely,) an Ouer-great *Heat* in proportion to the *Moiſture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moiſture*, then there is no difference to be ſeene betweene *Male* and *Female*:

male: As in the *Instances* of *Horses*, and *Dogges*. We see also, that the *Hornes*: of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* causeth *Pilosity*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the *Cause* of the *Beauty* and *Variety* of *Feathers*: Againe, *Heat* doth put forth many *Excrescenses*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the *Cause* of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combes* and *Spurres* of *Cockes*, *Gills* of *Turky-Cockes*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepenesse* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

Experiment Solitary touching the *Comparative Magnitude* of *Living Creatures*. 853

THere be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*, For *Fishes*, the cause may be, that because they Liue not in the *Aire*, they haue not their *Moisture* drawn and Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwayes, in a manner; and are supported by the *Water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts*, stay Longer time in the *Wombe*, than *Birds*, and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Siting* doth *Vivifie*, and not Nourish.

Experiment Solitary touching *Exossation* of *Fruits*. 854

WE haue partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this wee adde further, that the *Cause* must be *Aboundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Drie Sap*: And wee see that it is possible to make a *Tree* put forth only in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more into *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted vpon a *Colewort-Stalk*, sendeth forth a great *Apple* without a *Coare*. It is not vnlikely, that if the *Inward Fith* of a *Tree*, were taken out, so that the Iuyce came only by the *Barke*, it would work the *Effect*. For it hath beene obserued, that in *Pollards*, if the *water* get in on the *Top*, and they become Hollow, they put forth the more. We adde also, that it is deliuered for certaine by some, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* haue little or no Coares, and *Stones*.

Experiment Solitary touching the *Melioration* of *Tobacco*. 855

Tobacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the *English Tabacco*, hath small credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same *Cause*: So that a Triall

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some haue gone about to doe it by Drenching the *Englisſh Tobacco*, in a *Decoction* or *Infuſion* of *Indian Tobacco*; But thoſe are but Sophiſtications, and Toyes; For Nothing that is once Perfect, and hath run his Race, can receiue much Amendment. You muſt euer reſort to the Beginning of Things for *Melioration*. The Way of *Maturation* of *Tobacco* muſt, as in other *Plants*, be, from the *Heat*. Either of the *Earth*, or of the *Sunne*: We ſee ſome Leading of this in Musk-Melons; which are ſowne vpon a *Hot Bed*, Dunged below, vpon a Bancke turned vpon the *South Sunne*, to giue *Heat* by *Reflexion*; Laid vpon *Tiles*, which increaſeth the *Heat*; And couered with *Straw* to keepe them from *Cold*. They remoue them alſo, which addeth ſome *Life*: And by theſe Helps they become as good in *Englaud*, as in *Italy*, or *Prouence*. Theſe and the like Meanes, may be tried in *Tobacco*. Enquire alſo of the *Steeping* of the *Roots*, in ſome ſuch *Liquor*, as may giue them Vigour to put forth Strong.

Experiment Solitary touching ſeuerall *Heats*, working the ſame *Effects*. 856

Heat of the *Sun*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vinification* of *Liuing Creatures*, are both repreſented and ſupplied, by the *Heat* of *Fire*; And likewiſe, the *Heats* of the *Sunne*, and *Life*, are repreſented one by the other. *Trees*, ſet vpon the *Backs* of *Chimneyes*, doe ripen *Fruit* ſooner. *Vines*, that haue beene drawne in at the Window of a *Kitchin*, haue ſent forth *Grapes* ripe a Month (at leaſt) before others. *Stoues*, at the Backe of Walls, bring forth *Orenges* here with vs. *Eggs*, as is reported by ſome, haue beene hatched in the warmth of an *Ouen*. It is reported by the *Ancients*, that the *Eſtrich* Layeth her *Egs* vnder *Sand*, where the *Heat* of the *Sunne* diſcloſeth them.

Experiment Solitary touching *Swelling* and *Dilatation* in *Boyling*. 857

Barley in the *Boyling* ſwelleth not much; *Wheat* ſwelleth more; *Rize* extremely; In ſo much as a Quarter of a Pint (vnboyled) will ariſe to a Pint boiled. The *Cauſe* (no doubt) is, for that the more Cloſe and Compact the *Body* is, the more it will dilate: Now *Barley* is the moſt Hollow; *Wheat* more Solide than that; and *Rize* moſt Solide of all. It may be alſo that ſome *Bodies* haue a Kinde of *Lentour*, and more *Depertible Nature* than others; As we ſee it euident in *Colouration*; For a Small *Quantity* of *Saffron*, will Tint more, than a very great *Quantity* of *Breſill*, or *Wine*.

Experiment Solitary touching the *Dulceration* of *Fruits*. 858

Fruit groweth *Sweet* by *Rowling*, or *Preſſing* them gently with the *Hand*; As *Rowling-Peares*, *Damaſins*, &c. By *Rottenneſſe*; As *Medlars*, *Seruices*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roaſting*, *Stewing*, *Baking*, &c. The *Cauſe* of the *Sweetneſſe* by *Rowling*, and *Preſſing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fiſh*, *Fleſh*, &c. By *Rottenneſſe* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby diſgeſt the

the Harder Part; For in all *Putrifactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe euer feed vpon the *Tangible Parts*, and attenuate them. By seuerall *Maturations* is, by some *Degree* of *Heat*. And by *Fire* is, because it is the proper Work of *Heat* to Refine, and to Incorporate; And all *Soureneſſe* consisteth in some *Groſſneſſe* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which euer inducеth a Milder *Taſte*.

Experiment Solitary touching *Fleſh Edible*, and not *Edible*. 859

OF *Fleſhes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cauſe* is, for that they haue (commonly) too much *Bitterneſſe* of *Taſte*; And therefore those *Creatures*, which are Fierce and Cholericke, are not *Edible*; As *Lions*, *Wolues*, *Squirrells*, *Dogs*, *Foxes*, *Horſes*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde*, and *Fearefull*. Yet it is true, that *Horſes*, which are *Beaſts* of Courage, haue beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineſes* eat *Horſe-fleſh* at this day; And some *Gluttons* haue vſed to haue *Colts-fleſh* baked. In *Birds*, such as are *Carniuoræ*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reason is, rather the *Cholericke Nature* of those *Birds*, than their *Feeding* vpon *Fleſh*; For *Puits*, *Gulls*, *Shouelers*, *Ducks*, doe feed vpon *Fleſh*, and yet are Good *Meat*: And we see, that those *Birds*, which are of *Prey*, or feed vpon *Fleſh*, are good *Meat*, when they are very Young; As *Hawkes*, *Rookes* out of the Neaſt, *Owles*, &c. *Mans Fleſh* is not Eaten. The Reasons are Three: First, because *Men* in *Humanity* doe abhorre it: Secondly, because no *Liuing Creature*, that *Dyeth* of *it ſelfe*, is good to Eat: And therefore the *Caniballs* (themſelues) eat no *Mans-fleſh*, of those that *Dye* of *Themſelues*, but of such as are *Slaine*. The Third is, because there muſt be (generally) some *Diſparity*, between the *Nouriſhment*, and the *Body Nouriſhed*; And they muſt not be Ouer-neere, or like: Yet we see, that in great *Weakeneſſes*, and *Conſumptions*, *Men* haue beene sustained with *Womans Milke*: And *Ficinus* fondly (as I conceiue) aduiseth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *Witches* doe greedily eat *Mans-fleſh*; which If it be true, beſides a *Diuelliſh Appetite* in them, it is likely to proceed, for that *Mans-fleſh* may send vp high and Pleasing *Vapours*, which may stirre the *Imagination*; And *Witches* Felicity is chiefly in *Imagination*, as hath beene said.

Experiment Solitary touching the *Salamander*. 860

THere is an Ancient Receiued *Tradition* of the *Salamander*, that it liueth in the *Fire*, and hath force also to extinguiſh the *Fire*. It muſt haue two Things, if it be true, to this *Operation*: The One a very *Cloſe Skin*, whereby *Flame* which in the Midſt is not so hot, cannot enter: For wee see that if the *Palme* of the *Hand* be anointed thicke with *White* of *Egge*, and then *Aquauitæ* be powred vpon it, and Enflamed, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and

Quenching

Quenching vertue, in the *Body* of that *Creature*, which choaketh the *Fire*: Wee see that *Milke* quencheth *wild-fire*, better than *water*, because it entreth better.

Experiment Solitary touching the *Contrary Operations* of *Time*, vpon *Fruits* and *Liquors*.
861

Time doth change *Fruit*, (as *Apples*, *Peares*, *Pomgranates*, &c.) from more *Sowre*, to more *Sweet*: But contrariwise *Liquors* (euen those that are of the *Iuyce* of *Fruit*) from more *Sweet* to more *Sowre*; As *Wort*, *Must*, *New Veriuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kindes, the *Spirits* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but disgest: But in *Drinks* the *Spirits* doe reigne, and finding lesse Opposition of the *Parts*, become themselues more *Strong*, Which causeth also more Strength in the *Liquor*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquor* becommeth apt to *Burne*; But in Time, it causeth likewise, when the Higher *Spirits* are Euaporated, more *Sowrenesse*.

Experiment Solitary touching *Blowes* and *Bruises*.
862

IT hath beene obserued by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applyed presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath only a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters*, and *Ointments* do enter. Surely, the *Cause*, that *Blowes* and *Bruises* enduce *Swellings*, is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For That *Gouts*, and *Tooth-Aches* cause swelling, where there is no *Percussion* at all.

Experiment Solitary touching the *Orris Root*.
863

THe *Nature* of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*, And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to haue a Tender dainty *Heat*; Which when it commeth aboue Ground, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary touching the *Compression* of *Liquors*.
864

IT hath beene obserued by the *Ancients*, that a great *vessel* full, drawne into *Bottles*; And then the *Liquor* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquor*: And that this holdeth more in *Wine*, than in *water*. The *Cause* may be Triuiall; Namely, by the *Expence* of the *Liquor*, in regard some may sticke to the Sides of the *Bottles*: But there may be a *Cause* more Subtill; Which is, that the *Liquor* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquor* meeteth with *Liquor* chiefly; But in the *Bottles* a Small Quantity of *Liquor*, meeteth

teth with the Sides of the *Bottles*, which Compreſſe it ſo, that it doth not Open it againe.

Water, being contiguous with *Aire*, Cooleth it, but Moiſteneth it not, except it *Vapour*. The *Cauſe* is, for that *Heat*, and *Cold* haue a *Virtuall Tranſition*, without *Communication* of *Subſtance*; but *Moiſture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of ſuch ſeuerall Leuity, and Grauity, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewiſe lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running ſwiftly ouer a *Straw*, or *Smooth Body*, wetteth not.

Experiment Solitary, touching the *Working* of *Water* vpon *Aire Contiguous*.
865

Star-Light Nights, yea, and bright *Moone-ſhine Nights*, are *Colder* than *Cloudy Nights*. The *Cauſe* is, the *Drineſſe* and *Fineneſſe* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Iſlands*: And as for the *Moone*, though it ſelfe inclineth the *Aire* to *Moiſture*, yet when it ſhineth bright, it argueth the *Aire* is dry. Alſo *Cloſe Aire*, is warmer than *Open Aire*; which (it may be) is, for that the true *Cauſe* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is ſtronger; And againe, *Aire* it ſelfe, if it bee not altered by that *Expiration*, is not without ſome Secret *Degree* of *Heat*: As it is not likewiſe without ſome Secret *Degree* of *Light*: For otherwiſe *Cats*, and *Owles*, could not ſee in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Viſuall Spirits* of thoſe *Creatures*.

Experiment Solitary touching the *Nature* of *Aire*.
866

The *Eyes* doe moue one and the ſame way; For when one *Eye* moueth to the *Noſthrill*, the other moueth from the *Noſthrill*. The *Cauſe* is *Motion* of *Conſent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vſe* will induce the Contrary: For ſome can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be ſet vpon a Table, with a Candle behind them, both *Eyes* will moue Outwards; As affecting to ſee the light, and ſo induce *Squinting*.

Experiments in Conſort touching the *Eyes*, and *Sight*.
867

Wee ſee more exquiſitely with one *Eye Shut*, than with *Both Open*. The *Cauſe* is, for that the *Spirits Viſuall* vnite themſelues more, and ſo become Stronger. For you may ſee by looking in a *Glaſſe*, that when you ſhut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.
868

The *Eyes*, if the *Sight* meet not in one *Angle*, *See Things Double*. The *Cauſe* is, for that *Seeing* Two Things, and *Seeing* one Thing twice, worketh the ſame *Effect*: And therefore a little *Pellet*, held betweene two *Fingers* laid a-croſſe, ſeemeth *Double*.
869

Pore-blinde Men, ſee beſt in the *Dimmer Lights*; And likewiſe haue their *Sight* Stronger neere hand, than thoſe that are not *Pore-blinde*, And can Reade and Write ſmaller *Letters*. The *Cauſe* is, for that the *Spirits Viſuall*, in thoſe that are *Pore-blinde*, are Thinner and Rarer, than in others; And therefore the Greater *Light* diſperſeth them. For the ſame
870

Cause they need Contracting; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Lewell*, the *Sight* is the Stronger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Reade, put the Paper somewhat afarre off. The *Cause* is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blinde Men*, vnite not, but when the *Obiect* is at some good distance, from their *Eyes*.

871 *Men* see better, when their *Eyes* are ouer-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The *Reason* is, for that the *Glaring* of the *Sunne*, or the *Candle* doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For we see, that an *Ouer-light* maketh the *Eyes* Dazell; Insomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light Roome*, they seeme to haue a *Mist* before their *Eyes*, and see worse than they shall doe, after they haue stayed a little while, either in the *Light*, or in the *Darke*. The *Cause* is, for that the *Spirits Visuall*, are vpon a Sudden Change disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot contract suddenly; And when they are much *Contracted* by *Darkenesse*, they cannot *Dilate* suddenly. And Excesse of both these (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it be long, Destroyeth the *Eye*. For as long Looking against the *Sun*, or *Fire*, hurteth the *Eye*, by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872 It hath beene obserued, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The *Cause* is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seene in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes*, and the *Gills Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes* and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits* that ascend to them, as vnwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Deiectedly; And that *Repulsion* from the *Eyes*, Diuerteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873 The *Obiects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath beene said. The *Glimses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that haue glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull* Person; And the like; doe delight and exhilarate the *Spirits* much. The

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spirituall* of the *Senses*; whereby it hath no *Obiect* Grosse enough to offend it. But the *Cause* (chiefly) is, for that there be no *Actiue Obiects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Actiue*, and *Positiue*: So are *Sweet Smels*, and *Stinkes*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Ouer-Hot*, and *Ouer-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Priuatiues*; And therefore haue little or no *Actiuity*. Somewhat they doe Contristate, but very little.

Water of the *Sea*, or otherwise, looketh *Blacker* when it is moued, and *whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not *Straight*, and therefore must be darkned: whereas, when it resteth, the *Beames* doe passe Straight. Besides, *Splendour* hath a *Degree* of *whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *whiter* than *Glasse Simple*. This *Experiment* deserueth to be driuen further, in Trying by what meanes *Motion* may hinder *Sight*.

Experiment Solitary touching the *Colour* of the *Sea*, or other *Water*. 874

Shell-Fish haue beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they haue *Male*, and *Female*, as other *Fish* haue: Neither are they bred of *Putrifaction*; Especially such as doe Moue. Neuertheless, it is certaine, that *Oysters*, and *Cockles*, and *Muscles*, which Moue not, haue no discriminate *Sex*! *Quere* in what time, and how they are bred? It seemeth that *Shels* of *Oysters* are bred where none were before; And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath beene tried, that they doe not onely Gape, and Shut, as the *Oysters* doe, but Remoue from one Place to Another.

Experiment Solitary touching *Shell-Fish*. 875

THe *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limbes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Moving*, are somewhat holpen from the *Liuer*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the time of our Birth; But the *Limbes* are vsed most on the *Right Side*; whereby *Custome* helpeth; For we see that some are *Left-Handed*: Which are such, as haue vsed the *Left-Hand* most.

Experiment Solitary touching the *Right Side*, and the *Left*. 876

Frictions make the *Parts* more *Fleshie* and *Full*: As wee see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantity* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and digest any *Inutile* or *Excrementitious*

Experiment Solitary touching *Frictions*. 877

crementitious Moiſture, which lieth in the *Fleſh:* All which helpe *Aſſimilation*. *Frictions* alſo doe more *Fill*, and *Impinguate* the *Body*, than *Exerciſe*. The *Cauſe* is, for that in *Frictions*, the *Inward Parts* are at reſt; Which in *Exerciſe* are beaten (many times) too much: And for the ſame Reaſon, (as we haue noted heretofore) *Gally-Slaues* are *Fat* and *Fleſhie*, becauſe they ſtirre the *Limmes* more, and the *Inward Parts* leſſe.

Experiment Solitary touching *Globes* appearing *Flat* at *Diſtance*. 878

ALL *Globes* afar off appeare *Flat*. The *Cauſe* is, for that *Diſtance* being a *Secundary Obiect of Sight*, is not otherwiſe diſcerned, than by more or leſſe *Light*; which *Diſparity* when it cannot be diſcerned, all ſeemeth *One:* As it is (generally) in *Obiects* not diſtinctly diſcerned; For ſo *Letters*, if they be ſo farre off, as they cannot be diſcerned, ſhew but as a *Duskiſh Paper:* And all *Engrauings* and *Emboſſings*, (a farre off) appeare *Plaine*.

Experiment Solitary touching *Shadowes*. 879

THe *Vtmoſt Parts* of *Shadowes* ſeeme euer to *Tremble*. The *Cauſe* is, for that the little *Moats*, which we ſee in the *Sun*, doe euer Stirre, though there be no *wind*; And therefore thoſe Mouing, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe ſhew the *Shadow* to Moue, becauſe the *Medium* Moueth.

Experiment Solitary touching the *Rowling* and *Breaking* of the *Seas*. 880

SHallow and *Narrow Seas*, breake more than *Deepe* and *Large*. The *Cauſe* is, for that the *Impulſion* being the ſame in Both; Where there is greater *Quantitie* of *Water*, and likewiſe *Space* Enough; there the *Water* Rowleth and Moueth, both more Slowly, and with a Sloper Riſe, and Fall: But where there is leſſe *Water*, and leſſe *Space*, and the *Water* daſheth more againſt the Bottome, there it moueth more Swiftly, and more in *Precipice*; For in the *breaking* of the *Waues* there is euer a *Precipice*.

Experiment Solitary touching the *Dulceration* of *Salt-Water*. 881

IT hath beene obſerved by the *Ancients*, that *Salt Water Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it ſelfe *Raw:* And yet the *Taſte* of *Salt* in *Diſtillations* by *Fire*, riſeth not; For the *Diſtilled Water* will be *Freſh*. The *Cauſe* may be, for that the *Salt Part* of the *Water*, doth partly riſe into a Kinde of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome:* And ſo is rather a *Separation*, than an *Euaporation*. But it is too groſſe to riſe into a *Vapour:* And ſo is a *Bitter Taſte* likewiſe; For Simple *Diſtilled waters*, of *Wormewood*, and the like, are not Bitter.

Experiment Solitary touching the *Returne* of *Saltneſſe* in *Pits* vpon the *Sea-Shore*. 882

IT hath beene ſet downe before, that *Pits* vpon the *Sea-Shore*, turne into *Freſh Water* by *Percolation* of the *Salt* through the *Sand:* But it is further noted, by ſome of the *Ancients*, that in ſome Places of *Affricke*, after a time, the *Water* in ſuch *Pits* will become *Brackiſh* againe. The *Cauſe* is, for that after a time, the very *Sands*, thorow which the *Salt-water* paſſeth, become *Salt*; And ſo the *Strainer* it ſelfe is tincted with

Salt.

Salt. The remedy therefore is, to digge ſtill *New Pits*, when the old wax *Brackiſh*, As if you would change your *Strainer*.

IT hath beene obſerued by the *Ancients*, that *Salt Water*, will diſſolue *Salt* put into it, in leſſe time, than *Freſh-Water* will diſſolue it. The *Cauſe* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Subſtance*, draw the *Salt* new put in, vnto it; Whereby it diffuſeth in the *Liquor* more ſpeedily. This is a Noble *Experiment*, if it be true; For it ſheweth Meanes of more Quicke and Eaſie *Infuſions*; And it is likewiſe a good *Inſtance* of *Attraction*, by *Similitude* of *Subſtance*. Try it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Vnſugred*.

Experiments Solitary touching *Attraction* by *Similitude* of *Subſtance*. 883

PVt *Sugar* into *Wine*, part of it aboue, part vnder the *Wine*; And you ſhall finde, (that which may ſeeme ſtrange,) that the *Sugar* aboue the *Wine*, will ſoften and diſſolue ſooner, than that within the *Wine*. The *Cauſe* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is vnder the *Wine*, by Simple *Infuſion*, or *Spreading*; But that *Part* aboue the *Wine* is likewiſe forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquor*, if it be Contiguous: As we ſee it alſo in *Spunges*, put part about the *Water*. It is worthy the Inquiry, to ſee how you may make more *Accurate Infuſions*, by helpe of *Attraction*.

Experiment Solitary touching *Attraction*. 884

WAter in *Wells* is *warmer* in *Winter*, than in *Summer*: And ſo *Aire* in *Caues*. The *Cauſe* is, for that in the Hither *Parts*, vnder the *Earth*, there is a *Degree* of ſome *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which ſhut cloſe in, (as in *Winter*) is the More; But if it Perſpire, (as it doth in *Summer*,) it is the Leſſe.

Experiment Solitary touching *Heat* vnder *Earth*. 885

IT is reported, that amongſt the *Leucacians*, in *Ancient* time, vpon a Superſtition, they did vſe to precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with ſtrings, at ſome diſtance, many great *Fowles*; And fixing vnto his *Body* diuers *Feathers*, ſpread, to breake the *Fall*. Certainly many *Birds*, of good *wing*, (As *Kites*, and the like) would beare vp a good *weight* as they flie; And *Spreading* of *Feathers*, thin and cloſe, and in great Breadth, will likewiſe beare vp a great *weight*; Being euen laid, without Tilting vpon the Sides. The further *Extenſion* of this *Experiment* for *Flying* may be thought vpon.

Experiment Solitary touching *Flying* in the *Aire*. 886

THere is, in ſome Places, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Vpon the *Leaues* whereof there riſeth a *Tumour*, like a *Bliſter*; Which they gather, and rub out of it, a certaine *Red Duſt*, that conuerteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this *Duſt* they die *Scarlet*.

Experiment Solitary touching the *Dye* of *Scarlet*. 887

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with

Experiment Solitary tou-

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with their *wiues*. The like is practiſed in *Gaſconie*; Where it is called *Nouërl'eguillette*. It is practiſed alwaies vpon the *Wedding Day*. And in *Zant*, the Mothers themſelues doe it, by way of Preuention; Becauſe thereby they hinder other *Charmes*, and can vndoe their Owne. It is a Thing the *Ciuill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment Solitary touching the *Riſe of Water*, by *Meanes* of *Flame*.
889

IT is a Common *Experiment*, but the *Cauſe* is miſtaken. Take a *Pot*, (Or better a *Glaſſe*, becauſe therein you may ſee the *Motion*,) And ſet a *Candle* lighted in the *Bottome* of a *Baſen* of *Water*; And turne the *Mouth* of the *Pot*, or *Glaſſe*, ouer the *Candle*, and it will make the *Water* riſe. They aſcribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as ſoone as it is couered, being ſuffocated by the *Cloſe Aire*, leſſeneth by little and little: During which time, there is ſome little Aſcent of *water*, but not much: For the *Flame* Occupying leſſe and leſſe Roome, as it leſſeneth, the *Water* ſucceedeth. But vpon the *Inſtant* of the *Candles Going out*, there is a ſudden *Riſe*, of a great deale of *water*; For that the *Body* of the *Flame* filleth no more Place; And ſo the *Aire*, and the *water* ſucceed. It worketh the ſame *Effect*, if in ſtead of *water*, you put *Flower*, or *Sand*, into the *Baſen*: Which ſheweth, that it is not the *Flames* drawing the *Liquour*, as *Nouriſhment*; As it is ſuppoſed; For all *Bodies* are alike vnto it; As it is euer in *Motion* of *Nexe*; Inſomuch as I haue ſeene the *Glaſſe*, being held by the Hand, hath lifted vp the *Baſen*, and all: The *Motion* of *Nexe*, did ſo Claſpe the *Bottome* of the *Baſen*. That *Experiment*, when the *Baſen* was lifted vp, was made with *Oyle*, and not with *water*: Neuertheleſſe this is true, that at the very firſt *Setting* of the *Mouth* of the *Glaſſe*, vpon the *Bottome* of the *Baſen*, it draweth vp the *water* a little, and then ſtandeth at a Stay, almoſt till the *Candles Going out*, as was ſaid. This may ſhew ſome *Attraction* at firſt: But of this we will ſpeake more, when we handle *Attractions* by *Heat*.

Experiments in Conſort touching the *Influences* of the *Moone*.

Of the *Power* of the *Celeſtiall Bodies*, and what more Secret *Influences* they haue, beſides the two Manifeſt *Influences* of *Heat*, and *Light*, We ſhall ſpeake, when we handle *Experiments* touching the *Celeſtiall Bodies*: Meane-while, wee will giue ſame Directions for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moone*; which is our *Neareſt Neighbour*.

The *Influences* of the *Moone*, (moſt obſerued,) are Foure. The *Drawing forth* of *Heat*: The *Inducing* of *Putrifaction*: The *Increaſe* of *Moiſture*: The *Exciting* of the *Motions* of *Spirits*.

For

890 For the *Drawing forth* of *Heat*, we haue formerly preſcribed, to take *Water Warme*, and to ſet Part of it againſt the *Moone-Beames*, and Part of it with a *Skreene* between; And to ſee whether that which ſtandeth Expoſed to the *Beames*, will not *Coole* ſooner. But becauſe this is but a Small *Interpoſition*, (though in the *Sun* we ſee a Small *Shade* doth much,) it were good to try it; when the *Moone* ſhineth, & when the *Moone* ſhineth not at all; And with *Water Warme* in a *Glaſſe-Bottle*, as well as in a *Diſh*; And with *Cinders*; And with *Iron Red-Hot*; &c.

891 For the *Inducing* of *Putrifaction*, it were good to trie it with *Fleſh*, or *Fiſh*, Expoſed to the *Moone-Beames*; And againe Expoſed to the *Aire*, when the *Moone* ſhineth not, for the like time; To ſee whether will corrupt ſooner: And trie it alſo with *Capon*, or ſome other *Fowle*, layd abroad, to ſee whether it will mortifie, and become tender ſooner? Trie it alſo with Dead *Flies*, or Dead *wormes*, hauing a little *water* caſt vpon them, to ſee whether will *Putrifie* ſooner. Trie it alſo with an *Apple*, or *Orenge*, hauing *Holes* made in their *Tops*, to ſee whether will Rot or Mould ſooner? Trie it alſo with *Holland-Cheeſe*, hauing *Wine* put into it, whether will breed *Mites* ſooner, or greater?

892 For the *Increaſe* of *Moiſture*, the Opinion Receiued is; That *Seeds* will grow ſooneſt, And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c. will grow ſooneſt, if they be Set, or Cut, in the *Increaſe* of the *Moone*. Alſo that *Braines* in *Rabits*, *Wood-cockes*, *Calues*, &c. are fulleſt in the *Full* of the *Moone*: And ſo of *Marrow* in the *Bones*: And ſo of *Oiſters*, and *Cockles*, which of all the reſt are the eaſieſt tried, if you haue them in *Pits*.

893 Take ſome *Seeds*, or *Roots*, (as *Onions*, &c.) and ſet ſome of them immediatly after the *Change*; And others of the ſame kinde immediately after the *Full*. Let them be as Like as can be: The *Earth* alſo the ſame as neere as may be; And therefore beſt in *Pots*: Let the *Pots* alſo ſtand, where no *Raine*, or *Sunne* may come to them, leſt the *Difference* of the *weather* confound the *Experiment*: And then ſee in what Time, the *Seeds Set* in the *Increaſe* of the *Moone*, come to a certaine Height; And how they differ from thoſe that are *Set* in the *Decreaſe* of the *Moone*.

894 It is like, that the *Braine* of *Man* waxeth *Moiſter*, and *Fuller*, vpon the *Full* of the *Moone*: And therefore it were good for thoſe that haue *Moiſt Braines*, & are great *Drinkers*; to take *Fume* of *Lignum Aloes*, *Roſe-Mary*, *Frankincenſe*, &c. about the *Full* of the *Moone*. It is like alſo, that the *Humours* in *Mens Bodies*, Increaſe, and Decreaſe, as the *Moone* doth; And therefore it were good to Purge, ſome day, or two, after the *Full*; For that then the *Humours* will not repleniſh ſo ſoone againe.

895 As for the *Exciting* of the *Motion* of the *Spirits*, you muſt note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is cauſed from the *Moone*, by *Exciting* of the *Spirits*, as well by *Increaſe* of the *Moiſture*. But for *Spirits* in particular, the great *Inſtance* is in *Lunacies*.

896 There may be other Secret *Effects* of the *Influence* of the *Moone*, which are not yet brought into *Obſeruation*. It may be, that if it ſo fall

out,

out, that the *Wind be North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*. And if *South*, or *South-West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be obserued.

897 It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, and larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandry*, to put *Rams*, and *Bulls* to their *Female*, somewhat before the *Full* of the *Moone*. It may bee also, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Obseruation*: *Quære* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*?

Experiment Solitary touching *Vinegar*.

898 THe *Turning* of *Wine* to *Vinegar*, is a Kinde of *Putrifaction*: And in *Making* of *Vinegar*, they vse to set *Vessels* of *Wine*, ouer against the *Noone-Sunne*; which calleth out the more *Oily Spirits*, and leaueth the *Liquour* more *Soure*, and *Hard*. Wee see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said, that *Cider* in *Nauigations* vnder the *Line* ripeneth, when *Wine* or *Beere* soureth. It were good to set a *Rundlet* of *Verjuice* ouer against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will Ripen, and Sweeten.

Experiment Solitary touching *Creatures* that *Sleepe* all *Winter*.

899 THere be diuers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hogge*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Assimilating*; For whatsoeuer *Assimilateth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, haue beene obserued not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remoue*. And they get *Warme* and *Close Places* to *Sleepe* in. When the *Flemmings* Wintred in *Noua Zembla*, the *Beares*, about the Middle of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which Durst not before. It is noted by some of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with their Young, during that time of *Rest*: And that a *Beare*, *Bigge* with *Young*, hath seldome beene seene.

Experiment Solitary touching the *Generating* of *Creatures* by *Copulation*, and by *Putrifaction*.

900 SOme *Liuing Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrifaction*; And of those which come by *Putrifaction*, many doe (neuertheless) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Viuification*, is a *Gentle*, and *Proportionable Heat*, working vpon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and yeelding, is driuen forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*.

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Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrifaction*, haue euermore a *Closeneſſe*, *Lentour*, and *Sequacity*. It seemeth therefore, that the *Generation* by *Sperme* only, and by *Putrifaction*, haue two Different *Causes*. The first is, for that *Creatures* which haue a *Definite* and *Exact Shape*, (as those haue which are procreated by *Copulation*,) cannot be produced by a *weake* and *Casuall Heat*; Not out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Viuification* be of any length, then the *Spirit* will Exhale, before the *Creature* be *Mature*: Except it be Encloſed in a *Place* where it may haue *Continuance* of the *Heat*, *Acceſſe* of some *Nouriſhment* to maintaine it, and *Closeneſſe* that may keepe it from *Exhaling*. And such *Places* are the *wombes*, and *Matrices* of the *Females*. And therefore all *Creatures*, made of *Putrifaction*, are of more *Vncertaine Shape*; and are made in *Shorter Time*; And need not so Perfect an *Encloſure*, though some *Closeneſſe* be commonly required. As for the *Heathen Opinion* which was, that vpon great *Mutations* of the *world*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and such like, are now; Wee know it to be vaine. But if any such Thing should be admitted, Discoursing according to *Sense*, it cannot be, except you admit a *Chaos* first, and *Commixture* of *Heauen*, and *Earth*.

For the *Frame* of the *World*, once in Order, cannot effect it by any *Exceſſe* or *Casualty*.

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NATVRALL HISTORIE.

X. Century.

THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*; Which afterwards was, by the *Schoole* of *Plato*, and Others, Watered and Nourished. It was, that the *World* was *One Entire, Perfect, Liuing Creature*; In so much as *Appolonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Liuing Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By Which they did not intend God; (for they did admit of a *Deity* besides,) But only

Experiments in Consort, touching the *Transmission*, and *Influx* of *Immateriate Vertues*, and the *Force* of *Imagination*.

only the *Soule*, or *Essentiall Forme* of the *Vniuerse*. This *Foundation* being laid, they mought build vpon it; what they would; For in a *Liuing Creature*, though neuer so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of an one *Part* of the *Body*, instantly make a *Transcursion* throwout the whole *Body*: So that by this they did insinuate, that no *Distance* of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magical Operations*; But that, (for Example,) we mought here in *Europe*, haue *Sense* and *Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, *without*, and *against Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnity* and *Harmony* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit* of *Man*. (whom they call the *Microcosme*,) doe giue a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus*, and some darkesome *Authors* of *Magicke*, doe ascribe to *Imagination Exalted*: the *Power* of *Miracle-working Faith*. With these vast and Bottomlesse *Follies*, *Men* haue beene (in part) entertained.

But we, that hold firme to the *Workes* of *God*; And to the *Sense*, which is *Gods Lampe*; (*Lucerna Dei Spiraculum Hominis*;) will enquire with all Sobriety, and Seueritie, whether there be to be found, in the Foot-Steps of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either vpon the *Body Imaginant*, or vpon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Obseruations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although wee shall haue occasion to speake of this in more places than One, yet we will now make some Entrance thereinto.

Experiments in Consort, *Mastery*, touching *Transmission* of *Spirits*, and the *Force* of *Imagination*.

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MEn are to be Admonished, that they doe not withdraw Credit, from the *Operations* by *Transmission* of *Spirits*, and *Force* of *Imagination*, because the *Effects faile sometimes*. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that

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the *Infection* is receiued (many times) by the *Body Passiue*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it bee formed into a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Ouercome, by the *Minde* and *Spirit*, which is *Passiue* before it worke any manifest *Effect*. And therefore, they worke most vpon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearefull Persons*; *Children*, and *Young Creatures*.

Nescio quis teneros Oculus mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. as for the *Weakenesse* of the *Power* of them, vpon *Kings*, and *Magistrates*; It may be ascribed (besides the maine, which is the *Protection* of *God*, ouer those that Execute his Place) to the *Weakenesse* of the *Imagination* of the *Imaginant*: For it is hard for a *Witch*, or a *Sorcerer*, to put on a Beleefe, that they can hurt such Persons.

902 *Men* are to be Admonished, on the other side, that they doe not easily giue Place and Credit to these *Operations*, because they *Succeed many times*; For the *Cause* of this *Successe*, is (oft) to bee truly ascribed, vnto the *Force* of *Affection* and *Imagination*, vpon the *Body Agent*; And then by a *Secondary Meanes*, it may worke vpon a *Diuers Body*: As for Example, If a man carry a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeuing strongly, that it will helpe him to obtaine his *Loue*; Or to keepe him from danger of hurt in *Fight*; Or to preuaile in a *Suit*; &c. it may make him more *Actiue*, and *Industrious*; And Againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industry*, and *Perseuerance*, (especially, in *Ciuill Businesse*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the *Weaker Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to try Things oft, and neuer to giue ouer, doth Wonders: Therefore, it were a Meere *Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, vpon another *Body*, which is but the *Force* of *Imagination* vpon the Proper *Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly vpon the *Body* of the *Imaginant*: As we shall shew in due place.

903 *Men* are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as diuers wise *Iudges* haue prescribed, and cautioned, *Men* may not too rashly beleeue, the *Confessions* of *Witches*, nor yet the *Euidence* against them. For the *Witches* themselues are *Imaginatiue*, and beleeue oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-craft*. It is worthy the Obseruing, that both in *Ancient*, and *Late times*; (as in the *Thessalian Witches*, and the Meetings of *Witches* that haue beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselues into

other *Bodies*; &c. are ſtill reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Anointing* themſelues all ouer. This may iuſtly moue a *Man* to thinke, that theſe *Fables* are the *Effects* of *Imagination*: For it is certaine that *Ointments* do all, (if they be laid on any thing thicke) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the Particlar *Ingredients* of thoſe *Magicall Ointments*, it is like they are *Opiate* and *Soporiferous*. For *Anointing* of the *Fore-Head*, *Necke*, *Feet*, *Back-Bone*, we know is vſed for Procuring *Dead Sleepes*: And if any *Man* ſay, that this *Effect* would bee better done by Inward *Potions*; Anſwer may bee made, that the *Medicines*, which goe to the *Ointments*, are ſo ſtrong, that if they were vſed Inwards, they would kill thoſe that vſe them: And therefore they worke Potently, though Outwards.

Wee will diuide the Seuerall Kindes of the *Operations*, by *Tranſmiſſion* of *Spirits*, and *Imagination*; Which will giue no ſmall Light to the *Experiments* that follow. All *Operations* by *Tranſmiſſion* of *Spirits*, and *Imagination* haue this; That they *Worke* at *Diſtance*, and not at *Touch*; And they are theſe being diuguiſhed.

904 The firſt is the *Tranſmiſſion* or *Emiſſion*, of the *Thinner*, and more *Airie Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the reſt, the moſt *Corporeall*. But you muſt remember withall, that there be a Number of thoſe *Emiſſions*, both *wholeſome*, and *Vnwholeſome*, that giue no *Smell* at all: For the *Plague*, many times, when it is taken, giueth no *Sent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other Proofes, that differ not in *Smell* from other *Aires*. And vnder this Head, you may place all *Imbibitions* of *Aire*, where the *Subſtance* is *Materiall*, *Odour-like*; Whereof ſome neuertheleſſe are ſtrange, and very ſuddenly diffuſed; As the *Alteration*, which the *Aire* receiueth in *Aegypt*, almoſt immediately, vpon the *Riſing* of the *Riuer* of *Nilus*, whereof we haue ſpoken.

905 The Second is the *Tranſmiſſion* or *Emiſſion* of thoſe *Things* that we call *Spirituall Species*; As *Viſibles* and *Sounds*: The one whereof wee haue handled; And the other we ſhall handle in due place. Theſe moue ſwiftly, and at great diſtance; But then they require a *Medium* well diſpoſed, And their *Tranſmiſſion* is eaſily ſtopped.

906 The Third is the *Emiſſions*, which cauſe *Attraction* of *Certaine Bodies* at *Diſtance*; Wherein though the *Loadſtone* be commonly placed in the Firſt Ranke, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at diſtance; And the *Attraction* of *Heat* at diſtance; And that of *Fire* to *Naphtha*; And that of ſome *Herbs* to *water*, though at diſtance; And diuers others; We ſhall handle, but yet not vnder this preſent *Title*, but vnder the *Title* of *Attraction* in generall.

The

907 The Fourth is the *Emission* of *Spirits*, and *Immateriate Powers* and *Vertues*, in those Things, which worke by the *Vniuersall Configuration*, and *Sympathy* of the *world*; Not by *Formes*, or *Celestiall Influxes*, (as is vainly taught and receiued,) but by the *Primitiue Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this Kinde is the *Motion* of *Gravity*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde wee conceiue the *Maine Float* and *Re-float* of the *Sea* is, which is by *Consent* of the *Vniuerse*, as Part of the *Diurnall Motion*. These *Immateriate Vertues* haue this Property differing from Others; That the *Diuersity* of the *Medium* hindreth them not; But they passe thorow all *Mediums*; yet at *Determinate distances*. And of these we shall speake, as they are incident to seuerall *Titles*.

908 The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, vpon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be vehement; And the *Operation* of the *Imagination*, if it bee Strong. But these two are so *Coupled*, as we shall handle them together: For when an *Enuious*, or *Amorous Aspect*, doth infect the *Spirits* of Another, there is Ioyned both *Affection*, and *Imagination*.

909 The Sixth is, the Influxes of the *Heauenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

910 The Seuenth is the *Operations* of *Sympathy*; Which the *writers* of *Naturall Magicke* haue brought into an *Art* or *Precept*: And it is this; That if you desire to Super-induce, any *Vertue* or *Disposition*, vpon a *Person*, you should take the *Liuing Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* haue beene in *Fight*; And let them be worne, vpon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake vnder this present *Title*.

911 The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly auouched by many: And wee haue set it downe, as a Law to our Selues, to examine things to the Bottome; And not to receiue vpon Credit, or reiect vpon Improbabilities, vntill there hath passed a due Examination. This is, the *Sympathy* of *Individuals*: For as

there is a *Sympathy* of *Species*; So (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things*, that haue beene once *Contiguous*, or *Entire*, there ſhould remaine a *Tranſmiſſion* of *Vertue*, from the One to the Other: As betweene the *Weapon* and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli*: And ſo of a *Peece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Conſumed or Putrified, it will worke vpon the other *Part Severed*. Now wee will purſue the *Inſtances* themſelues.

Experiments in Conſort touching Emiſſion of Spirits in *Vapour*, or Exhalation, Odour-like.

THe *Plague* is many times taken, without *Manifeſt Senſe*, as hath bin ſaid. And they report, that where it is found, it hath a Sent, of the *Smell* of a *Mellow Apple*; And (as ſome ſay) of *May-Flowers*: And it is alſo receiued, that *Smels* of *Flowers*, that are *Mellow* and *Luſhious*, are ill for the *Plague*; As *White Lillies*, *Cowſlips*, and *Hyacinths*.

The *Plague* is not eaſily receiued by ſuch, as continually are about them, that haue the *Plague*; As *Keepers* of the *Sicke*, and *Phyſitians*; Nor againe by ſuch as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe* and *Seed*; &c.) Or outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and ſuch as are of a *Dry* and *Cold Complexion*. On the other ſide, the *Plague* taketh ſooneſt hold of thoſe that come out of a *Freſh Aire*; And of thoſe that are *Faſting*; And of *Children*; And it is likewiſe noted to goe in a *Blond*, more than to a *Stranger*.

The moſt Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Priſoners* haue beene Long, and Cloſe, and Naſtily kept; Whereof we haue had, in our time, Experience, twice, or thrice; when both the *Iudges* that ſate vpon the *Iayle*, and Numbers of thoſe that attended the Buſineſſe, or were preſent, *Sickned* vpon it, and *Died*. Therefore it were good wiſdome, that in ſuch Caſes, the *Iayle* were Aired, before they be brought forth.

Out of queſtion, if ſuch *Foule Smels* bee made by *Art*, and by the Hand, they conſiſt chiefly of *Mans Fleſh*, or *Sweat*, *Putrified*; For they are not thoſe *Stinkes*, which the *Noſthrils* Steight abhorre, and expell, that are moſt *Pernicious*; But ſuch *Aires*, as haue ſome Similitude with *Mans Body*; And ſo inſinuate themſelues, and betray the *Spirits*. There may be great danger, in vſing ſuch Compoſitions in great Meetings of People, within Houſes; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poiſoning* of *Aire* is no leſſe dangerous than *Poiſoning* of *Water*; Which hath beene vſed by the *Turkes* in the Warres; And was vſed by *Emanuel Commenius* towards the *Chriſtians*, when they paſſed thorow his *Countrey* to the *Holy Land*. And theſe *Empoiſonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of the *Infection*: And therefore where any ſuch Thing is feared, it were good, thoſe *Publique Places* were perfumed, before the *Aſſemblies*.

The *Empoyſonment* of Particular *Perſons*, by *Odours*, hath beene reported

ported to be in *Perfumed Gloues*, or the like: And it is like, they Mingle the *Poiſon* that is deadly, with ſome *Smels* that are Sweet; which alſo maketh it the ſooner receiued. *Plagues* alſo haue beene raiſed by *Anointings* of the *Chinkes* of *Doores*, and the like; Not ſo much by the Touch, as for that it is common for *Men*, when they finde any thing Wet vpon their Fingers, to put them to their *Noſe*; Which Men therefore ſhould take heed how they doe. The beſt is, that theſe *Compoſitions* of *Infectious Aires*, cannot bee made without *Danger* of *Death*, to them that make them. But then againe, they may haue ſome *Antidotes* to ſaue themſelues; So that *Men* ought not to be ſecure of it.

There haue beene, in diuers *Countries*, great *Plagues*, by the *Putrifa-* 917
ction, of great *Swarmes* of *Graſſe-Hoppers*, and *Locuſts*, when they haue beene dead, and caſt vpon Heaps.

It hapneth oft in *Mines*, that there are *Damps*, which kill; either by 918
Suffocation, or by the *Poiſonous Nature* of the *Minerall*: And thoſe that deale much in *Refining*, or other Workes about *Metalls*, and *Mineralls*, haue their *Braines* Hurt and Stupefied by the *Metalline Vapors*. Amongſt which, it is noted, that the *Spirits* of *Quick-Siluer*, either flv to the *Skull*, *Teeth*, or *Bones*; In ſo much as *Gilders* vſe to haue a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Siluer*; Which *Gold* afterwards they finde to be Whitened. There are alſo certaine *Lakes* and *Pits*, ſuch as that of *Auernus*, that *Poiſon Birds* (as is ſaid) which fly ouer them; Or *Men*, that ſtay too long about them.

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Cloſe Roome, hath kil- 919
led many: And it is the more dangerous, becauſe it commeth without any *Ill Smell*; But ſtealeth on by little and little; Enducing only a *Faintneſſe*, without any *Manifeſt Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*; and that they could gather no more Sticks, they fell to make Fire of ſome *Sea-Coale* they had, wherewith (at firſt) they were much refreſhed; But a little after they had ſit about the *Fire*, there grew a Generall Silence, and lothneſſe to ſpeake amongſt them; And immediately after, One of the *Weakeſt* of the *Company*, fell downe in a Sowne; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and ſo ſaued themſelues. The *Effect* (no doubt) is wrought by the *Inſpiſſation* of the *Aire*; And ſo of the *Breath* and *Spirits*. The like enſueth in *Roomes* newly *Plaſtered*, if a *Fire* be made in them; Whereof no leſſe *Man* than the Emperour *Iouinianus* Died.

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, 920
vpon the firſt *Showers*, after a long *Drought*.

It hath come to paſſe, that ſome *Apothecaries*, vpon *Stamping* of *Co-* 921
loquintida, haue beene put into a great *Skouring*, by the *Vapour* only.

It hath beene a Practice to burne a *Pepper*, they call *Ginny-Pepper*; 922
Which hath ſuch a ſtrong *Spirit*, that it prouoketh a *Continuall Sneezing*, in thoſe that are in the *Roome*.

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And 923
that a *Menſtruous Woman*, looking vpon a *Glaſſe*, doth ruſt it. Nay they

haue an *Opinion*, which ſeemeth *Fabulous*; That *Menſtruous Women*, going ouer a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

924 The *Tradition* is no leſſe *Ancient*, that the *Baſiliske* killeth by *Aſpect*; And that the *Wolfe*, if he ſee a *Man* firſt, by *Aſpect* ſtriketh a *Man* hoarſe.

925 *Perfumes* Conuenient doe dry and ſtrengthen the *Braine*; And ſtay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Roſe-Mary* dryed, and *Lignum Aloes*, and *Calamus*, taken at the *Mouth*, and *Noſthrils*; And no doubt there be other *Perfumes*, that doe moiſten and refreſh; And are fit to be vſed in *Burning Agues*, *Conſumptions*, and too much *Wakefulneſſe*; Such as are, *Roſe-water*, *Vinegar*, *Limon-pils*, *Violets*, the *Leaues* of *Vines* ſprinckled with a little *Roſe-water*, &c.

926 They doe vſe in *Sudden Faintings*, and *Swoonings*, to put a *Handkerchiefe* with *Roſe-water*, or a *Little Vinegar*, to the *Noſe*; Which gathereth together againe the *Spirits*, which are vpon point to reſolue, and fall away.

927 *Tobacco* comforteth the *Spirits*, and diſchargeth *Wearineſſe*; Which it worketh partly by Opening; But chiefly by the *Opiate Vertue*, which condenſeth the *Spirits*. It were good therefore to try the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to dry and comfort, as for other *Intentions*. I wiſh Triall be made of the *Drying Fume*, of *Roſe-Mary*, and *Lignum Aloes*, before mentioned, in *Pipe*; And ſo of *Nutmeg*, and *Folium Indum*; &c.

928 The *Following* of the *Plough*, hath beene approued, for refreſhing the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *wheat*, or *Rie*, is not ſo good; Becauſe the *Earth* hath ſpent her Sweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you ſow *Barley*. But becauſe Ploughing is tied to *Seaſons*, it is beſt to take the *Aire* of the *Earth*, new turned vp, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themſelues much good by kneeling vpon a Cuſhion, and *weeding*. And theſe Things you may practiſe in the beſt *Seaſons*; Which is euer the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweeteſt Earth* you can chuſe. It would be done alſo, when the *Dew* is a little off the *Ground*, leſt the *Vapour* be too Moiſt. I knew a great *Man*, that liued Long, who had a Cleane *Clod* of *Earth*, brought to him euery *Morning*, as he ſate in his *Bed*; And he would hold his *Head* ouer it, a good pretty while. I Commend alſo, ſometimes, in *Digging* of *New Earth*, to powre in ſome *Malmeſey*, or *Greeke wine*; That the *Vapour* of the *Earth*, and *wine* together, may comfort the *Spirits*, the more; Prouided alwaies, it be not taken for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

929 They haue, in *Phyſicke*, Vſe of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Prouoking* of *Sleepe*, &c. For though thoſe *Things* be not ſo Strong as *Perfumes*, yet you may haue them continually in your *Hand*; whereas *Perfumes* you can take but at

Times;

Times; And beſides, there be diuers *Things*, that breath better of themſelues, than when they come to the *Fire*; As *Nigella Romana*, the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly vſed) doe Coole and condenſe the *Spirits*; And I with the ſame to be tried outwardly in *Vapours*. The one is *Nitre*, which I would haue diſſolued in *Malmeſey*, or *Greeke-Wine*, and ſo the *Smell* of the *Wine* taken; or if you would haue it more forcible, poure of it vpon a *Fire-pan*, well heated, as they doe *Roſe-Water*, and *Vinegar*. The other is, the *Diſtilled Water* of *wilde Poppy*; which I wiſh to be mingled, at halfe, with *Roſe Water*, and ſo taken with ſome *Mixture* of a few *Cloues*, in a *Perfuming-Pan*. The like would be done with the *Diſtilled Water* of *Saffron Flowers*. 930

Smells of *Muſke*, and *Amber*, and *Ciuit*, are thought to further *Venereous Appetite*: Which they may doe by the *Refreſhing* and *Calling forth* of the *Spirits*. 931

Incenſe, and *Nidorous Smells*, (ſuch as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to diſpoſe *Men* to *Deuotion*: Which they may doe, by a kinde of *Sadneſſe*, and *Contriſtation* of the *Spirits*: And partly alſo by *Heating*, and *Exalting* them. We ſee that amongſt the *Iewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vſes*. 932

There be ſome *Perfumes*, preſcribed by the *Writers* of *Naturall Magicke*, which procure *Pleaſant Dreames*; And ſome others, (as they ſay,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c. 933

It is certaine that *Odours* doe, in a ſmall Degree, Nouriſh; Eſpecially the *Odour* of *Wine*: And we ſee men a hungred, doe loue to ſmell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *woman*, in the Houſe, complaine, that ſhe ſhould be kept from being at a *Feaſt*, and *Solemnity*, (which ſhe much deſired to ſee,) becauſe there would be a *Corps* in the Houſe; Whereupon he cauſed *Loaues* of *New Bread* to be ſent for, and opened them, And powred a litle *Wine* into them; And ſo kept himſelfe aliue with the *Odour* of them, till the *Feaſt* was paſt. I knew a *Gentleman*, that would faſt (ſometimes) three or foure, yea fiue dayes, without *Meat*, *Bread*, or *Drinke*; But the ſame *Man* vſed to haue continually, a great *Wiſpe* of *Herbs*, that he ſmelled on: and amongſt thoſe *Herbs*, ſome *Eſculent Herbs* of ſtrong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like. 934

They doe vſe, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by thoſe *Ill Smells*, the *Riſing* of the *Mother* is put downe. 935

There be *Aires*, which the *Phyſitians* aduiſe their *Patients* to remoue vnto, in *Conſumptions*, or vpon *Recouery* of *Long Sicknesſes*: which (commonly) are *Plaine Champaignes*, but *Graſing*, and not Ouer-growne with *Health*, or the like: Or elſe *Timber-Shades*, as in *Forreſts*, and the like. It is noted alſo, that *Groues* of *Bayes* doe forbid *Peſtilent Aires*: Which was 936

accounted

accounted a great *Cause* of the Wholesome *Aire* of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbs* of themselues; As *wilde Thyme*, *Wilde Maioram*, *Penny-Roiall*, *Camomill*, And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discouer an *Excellent Aire*.

937 It were good for *Men*, to thinke of hauing *Healthfull Aire*, in their *Houses*; Which will neuer be, if the *Roomes* be *Low-roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Vnequall*; Which is a great Enemy to *Health*. The *windowes* also should not be high vp to the *Roofe*, (which is in vse for Beautie, and Magnificence,) but low. Also *Stone-walls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*. Nay it hath beene vsed by some, with great Successe, to make their *walls* thicke; And to put a Lay of *Chalke* betweene the *Brickes*, to take away all *Dampishnesse*.

Experiment Solitary touching the *Emissions* of *Spirituall Species* which *Affect* the *Senses*.

938 THese *Emissions*, (as we said before,) are handled, and ought to be handled, by themselues, vnder their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this place, it shall suffice to giue some generall *Obseruations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effectiue* of any *Thing*; Nor leaue no *worke* behinde them; But are *Energies* meerely; For their *Working* vpon *Mirrours*, and places of *Eccho*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, only *Repercussed*. And as for the *Shaking* of *windowes*, or *Rarefying* the *Aire* by *Great Noyses*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Nice* a *Nature*, as they affect onely such a Rare, and Attenuate *Substance*, as is the *Spirit* of *Liuing Creatures*.

Experiments in Consort, touching the *Emissions* of *Immateriate Vertues* from the *Minder*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impressions*.

939 IT is mentioned in some *Stories*, that where *Children* haue beene *Exposed*, or taken away young from their *Parents*; And that afterwards they haue approached to their *Parents* presence, the *Parents*, (though they haue not knowne them,) haue had a *Secret Ioy*, or Other *Alteration* thereupon.

940 There was an *Ægyptian South-Sayer*, that made *Anthonius* beleeue, that his *Genius*, (which otherwise was *Braue*, and *Confident*,) was, in the Presence of *Octauianus Cæsar*, *Poore*, and *Cowardly*: And therefore, he aduised him, to absent himselfe, (as much as hee could,) and remoue farre from him. This *South-Sayer* was thought to bee suborned by *Cleopatra*, to make him liue in *Ægypt*, and other Remote *Places* from *Rome*. Howsoeuer the Conceit of a *Predominant* or *Mastering Spirit*, of one *Man* ouer Another, is Ancient, and Receiued still, euen in *Vulgar Opinion*.

There

941 There are Conceits, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to bee *Sad*, and *Ill disposed*; And contrariwise, that Others, that are of a *Iouiall Nature*, doe dispose the *Company to be Merry* and *Cheerefull*. And againe, that some *Men* are *Luckie* to be *kept Company* with, and *Employed*; And Others *Vnluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence*, one with another, as well as from *Body* to *Body*.

942 It hath beene obserued, that *Old Men*, who haue loued *Young Company*, and beene Conuersant continually with them, haue beene of *Long Life*; Their *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which euer had *Young Auditors*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who liued till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c.

943 *Audacitie* and *Confidence* doth, in Ciuill Businesse, so great Effects, as a *Man* may (reasonably) douot, that besides the very *Daring*, and *Earnestnesse*, and *Persisting* and *Importunitie*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*.

944 The *Affections*, (no doubt) doe make the *Spirits* more *Powerfull*, and *Actiue*; And especially those *Affections*, which draw the *Spirits*, into the *Eyes*: Which are two: *Loue*, and *Enuy*, which is called *Oculus Malus*: As for *Loue*; the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Louer*, doth passe into the *Spirits*, of the *Person Loued*; Which causeth the desire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contact*, and *Coniunction*, which is in *Louers*. And this is obserued likewise, that the *Aspects* that procure *Loue*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Enuy*, that emitteth some *Maligne* and *Poisonous Spirit*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an *Enuious Eye* is cast vpon *Persons* in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Enuious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* haue beene ill disposed, for some Dayes following. Wee see the Opinion of *Fastination* is Ancient, for both *Effects*: Of Procuring *Loue*; And *Sickenesse* caused by *Enuy*: And *Fascination* is euer by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most forcibly by the *Eye*.

945 *Feare*, and *Shame*, are likewise *Infectiue*; for wee see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now

Now we will ſpeake of the *Force* of *Imagination* vpon other *Bodies*; And of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I vnderſtand to be, the *Repreſentation* of an *Indiuiduall Thought*. *Imagination* is of three Kinds: The Firſt *Ioyned* with *Beleefe* of that which is to *Come*: The Second *Ioyned* with *Memory* of that which is *Paſt*: And the Third is of *Things Preſent*, or as if they were *Preſent*; For I comprehend in this, *Imaginations Faigned*, and at *Pleaſure*; As if one ſhould *Imagine* ſuch a *Man* to be in the *Veſtments* of a *Pope*; Or to haue *Wings*. I ſingle out, for this time, that which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquiſition* of this *Subiect*, in our way, (which is by *Induction*.) is wonderfull hard; for the *Things* that are reported, are Full of *Fables*; And *New Experiments* can hardly be made, but with Extreme Caution, for the Reaſon which we will hereafter declare.

The *Power* of *Imagination* is in three Kindes; The Firſt, vpon the *Body* of the *Imaginant*; Including likewiſe the *Childe* in the *Mothers Wombe*; The Second is, the *Power* of it vpon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*. &c. The Third is, the *Power* of it, vpon the *Spirits* of *Men* and *Liuing Creatures*: And with this laſt we will only meddle.

The *Probleme* therefore is, whether a *Man Conſtantly* and *Strongly Beleeuing*, that ſuch a *Thing* ſhall be; As that ſuch an *One* will *Loue Him*; Or that ſuch an *One* will *Grant him* his *Requeſt*; Or that ſuch an *One* ſhall *Recouer* a *Sickeneſſe*; Or the like;) It doth helpe any thing to the *Effecting* of the *Thing* it ſelfe. And here againe wee muſt warily diſtinguiſh; For it is not meant, (as hath beene partly ſaid before,) that it ſhould helpe by *Making* a *Man* more *Stout*, or more *Induſtrious*; (In which kinde a *Conſtant Beleefe* doth much;) But meerely by a *Secret Operation*, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard, (as we began to ſay,) to make any *New Experiment*; For I cannot *command* my Selfe to *Beleeue* what I will, and ſo no *Triall* can be made. Nay it is worſe; For whatſoeuer a *Man Imagineth doubtingly*, or with *Feare*, muſt needs doe hurt, if *Imagination* haue any *Power* at all;

For

For a *Man* repreſenteth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom hee may Create *Beleefe*, and not by *Himſelfe*; Vntill *Himſelfe* haue found by *Experience*, that *Imagination* doth preuaile; For then *Experience* worketh in *Himſelfe Beleefe*; If the *Beleefe*, that ſuch a *Thing* ſhall be, be ioyned with a *Beleefe*, that his *Imagination* may procure it.

946 For Example; I related one time to a *Man*, that was Curious, and Vaine enough in theſe Things; *That I ſaw a Kinde of* Iugler, *that had a* Paire *of* Cards, *and would tell a* Man *what* Card *he thought*. This Pretended Learned Man told me; It was a Miſtaking in Me; *For (ſaid he) it was not the* Knowledge *of the* Mans Thought, *(for that is proper to* God,) *but it was the* Inforcing *of a* Thought *vpon him, and* Binding *his* Imagination *by a* Stronger, *that he could* Thinke no other *Card*. And thereupon he asked me a *Queſtion*, or two, which I thought he did but cunningly, knowing before what vſed to be the *Feats* of the *Iugler*. *Sir, (ſaid he,) doe you remember whether he told the* Card, *the* Man *thought*, Himſelfe, *or bade* Another *to tell it*. I anſwered (as was true;) *That he bade Another tell it*. Whereunto he ſaid; *So I thought: For (ſaid he) Himſelfe could not haue put on ſo ſtrong an* Imagination; *But by telling the other the* Card, *(who beleeued that the* Iugler *was ſome Strange* Man, *and could doe Strange* Things,) *that other* Man *caught a ſtrong* Imagination. I harkened vnto him, thinking for a Vanity he ſpoke prettily. Then he asked me another *Queſtion:* Saith he, *Doe you remember whether he bade the* Man *thinke the* Card *firſt, and afterwards told the other* Man *in his Eare, what hee ſhould thinke, Or elſe that he did whiſper firſt in the* Mans *Eare, that ſhould tell the* Card, *telling that ſuch a* Man *ſhould thinke ſuch a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did firſt whiſper the* Man *in the Eare, that ſuch a* Man *ſhould thinke ſuch a* Card; Vpon this the *Learned Man* did much Exult, and Pleaſe himſelfe, ſaying; *Loe, you may ſee that my* Opinion *is right: For if the* Man *had thought firſt, his* Thought *had beene Fixed; But the other* Imagining *firſt, bound his* Thought. Which though it did ſomewhat ſinke with mee, yet I made Lighter than I thought, and ſaid; *I thought it was* Confederacie, *betweene the* Iugler, *and the two* Seruants: Though (Indeed) I had no Reaſon ſo to thinke: For they were both my *Fathers* Seruants; And he had neuer plaid in the Houſe before. The *Iugler* alſo did cauſe a *Garter* to be held vp; And tooke vpon him, to know, that ſuch a *One*, ſhould point in ſuch a *Place*, of the *Garter*; As it ſhould be neare ſo many *Inches* to the *Longer End*, and ſo many to the *Shorter*; And ſtill he did it, by *Firſt Telling* the *Imaginer*, and after *Bidding* the *Act or Thinke*.

Hauing told this *Relation*, not for the Weight thereof, but becauſe

becauſe it doth handſomely open the *Nature* of the *Queſtion*; I returne to that I ſaid; That *Experiments* of *Imagination*, muſt be practiſed by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleefe*: the Firſt is *Experience*: The Second is *Reaſon*: And the Third is *Authority*: And that of theſe, which is farre the moſt *Potent*, is *Authoritie*: For *Beleefe* vpon *Reaſon* or *Experience* will Stagger.

947 For *Authority*, it is of two Kindes: *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A man may exerciſe them by *Himſelfe*; But for *Beleefe* in a *Man*, it muſt be by *Another*. Therefore, if a *Man* beleeue in *Aſtrologie*, and finde a *Figure* Proſperous; Or beleeue in *Naturall Magicke*, that a *Ring* with ſuch a *Stone*, or ſuch a *Peece* of a *Liuing Creature*, Carried, will doe good; It may helpe his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Actiue*. But howſoeuer all *Authority* muſt be out of a *Mans Selfe*, turned (as was ſaid,) either vpon an *Art*, or vpon a *Man*: And where *Authority* is from one *Man* to another, there the Second muſt be *Ignorant*, and not *Learned*, or *Full* of *Thoughts*; And ſuch are (for the moſt part) all *Witches*, and *Superſtitious Perſons*; Whoſe *Beleefes*, tied to their *Teachers*, and *Traditions* are no whit controlled, either by *Reaſon* or *Experience*: And vpon the ſame Reaſon, in *Magicke*, they vſe (for the moſt part,) *Boyes*, and *Young People*, whoſe *Spirits* eaſilieſt take *Beleefe* and *Imagination*.

Now to fortifie *Imagination*, there be three Wayes: The *Authority* whence the *Beleefe* is deriued; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refreſh* it.

948 For the *Authoritie*, wee haue already ſpoken; As for the Second; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination*; We ſee what hath beene vſed in *Magick*; (If there be in thoſe Practiſes any thing that is purely *Naturall*;) As *Veſtments*; *Characters*; *Words*; *Seales*; Some *Parts* of *Plants*, or *Liuing Creatures*; *Stones*; *Choice* of the *Houre*; *Geſtures* and *Motions*; Alſo *Incenſes*, and *Odours*; *Choice* of *Society*, which increaſeth *Imagination*; *Diets* and *Preparations* for ſome time before. And for *words*, there haue beene euer vſed, either *Barbarous Words*, of no Senſe, leſt they ſhould diſturbe the *Imagination*; Or *words* of *Similitude*, that may ſecond and feed the *Imagination*: And this was euer as well in *Heathen Charmes*, as in *Charmes of* latter Times. There are vſed alſo *Scripture words*; For that the *Beleefe*, that *Religious Texts*, and *words*, haue Power, may ſtrengthen the *Imagination*. And for the ſame Reaſon, *Hebrew Words*, (which amongſt vs is counted the *Holy Tongue*, and the *Words* more *Myſticall*,) are often vſed.

949 For the *Refreſhing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) Wee ſee the Practiſes of *Magicke*, as in *Images* of *Wax*

and

and the like, that should Melt by little, and little; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Imateriate* a *Vertue*, as to work at great *Distances*; Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be Competent; The *Medium* not Aduerse; And the *Body* Apt and Proportionate. Therefore if there be any Operation vpon *Bodies*, in Absence, by Nature; it is like to be conueyed from *Man* to *Man*, as *Fame* is; As if a *Witch* by *Imagination*, should hurt any a farre off, it cannot bee naturally, but by Working vpon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* vpon the *Imagination* of *Another*; And so vpon *Another*; till it come to one that hath resort to the *Party Intended*; And so by *Him* to the *Party intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Party*, or the like; yet there is lesse Credit to be giuen to those Things, except it be by *Working* of euill *Spirits*. 950

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, vpon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare Proofes; For that they may bee, by a Tacite *Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to New *Experiments*: Wherein wee can giue only *Directions* of *Trials*, and not any *Positiue Experiments*. And if any *Man* thinke, that we ought to haue staied, till We had made *Experiment*, of some of them our selues (as wee doe commonly in other *Titles*) the Truth is, that these *Effects* of *Imagination* vpon other *Bodies*, haue so little Credit with vs, as we shall try them at leisure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that Hee, by whom you worke, haue a *Precedent Opinion* of you, that you can doe Strange Things, Or that you are a *Man* of *Art*, as they call it; For else the Simple *Affirmation* to Another, that this or that shall be, can worke but a weake *Impression* in his *Imagination*. 951

It were good, because you cannot discerne fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did vse the *Imagination* of more than *One*; That so you may light vpon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Seruants*, that their *Master* shall surely recouer. 952

The *Imagination* of *One*, that you shall vse, (such is the Variety of *Mens Mindes*,) cannot be alwaies alike *Constant*, and *Strong*; And if the 953

Succeſſe follow not ſpeedily, it will faint and leeſe *Strength*. To remedy this, you muſt pretend to Him, whoſe *Imagination* you vſe, ſeuerall *Degrees* of *Meanes*, by which to *Operate*; As to preſcribe him, that euery three Daies, if he finde not the Succeſſe Apparant, he doe vſe another *Roote*, or *Part* of a *Beaſt*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seuen Times. And to you muſt preſcribe a good Large Time for the *Effect* you promiſe; As if you ſhould tell a *Seruant* of a *Sick-man*, that his *Maſter* ſhall recouer, but it will be Fourteene daies, ere hee findeth it apparantly, &c. All this to entertaine the *Imagination*, that it wauer leſſe.

954 It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenſes* and *Perfumes* taken at the *Noſthrils*; And *Ointments* of ſome *Parts*; doe (naturally) worke vpon the *Imagination* of Him that taketh them. And therefore it muſt needs greatly *Cooperate* with the *Imagination* of him, whom you vſe, if you preſcribe him, before he doe vſe the *Receit*, for the *Worke* which he deſireth, that hee doth take ſuch a *Pill*, or a *Spoonfull* of *Liquor*; Or burne ſuch an *Incenſe*; Or *Anoint* his *Temples*, or the *Soles* of his *Feet*, with ſuch an *Ointment*, or *Oyle*: And you muſt chuſe, for the *Compoſition* of ſuch *Pill*, *Perfume*, or *Ointment*, ſuch *Ingredients*, as doe make the *Spirits*, a little more *Groſſe*, or *Muddy*: Whereby the *Imagition* will fix the better.

955 The *Body Paſſiue*, and to be *wrought Vpon*, (I meane not of the *Imaginant*,) is better wrought vpon (as hath beene partly touched) at ſome *Times*, than at others: As if you ſhould preſcribe a *Seruant*, about a *Sick Perſon* (whom you haue poſſeſſed, that his *Maſter* ſhall recouer) when his *Maſter* is faſt a ſleepe, to vſe ſuch a *Root*, or ſuch a *Root*. For *Imagination* is like to worke better vpon *Sleeping Men*, than *Men Awake*. As we ſhall ſhew when we handle *Dreames*.

956 We finde in the *Art* of *Memory*, that *Images Viſible*, worke better than other *Conceits*: As if you would remember the Word *Philoſophy*, you ſhall more ſurely do it, by *Imagining* that ſuch a *Man*, (For *Men* are beſt *Places*) is reading vpon *Ariſtotles Phyſickes*; Than if you ſhould Imagine him to ſay; *I'le goe ſtudy Philoſophy*. And therefore, this *Obſeruation* would be tranſlated to the *Subiect* wee now ſpeake of: For the more Luſtrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceiue, that you ſhall, in that *Experiment* (whereof wee ſpake before) of *Binding* of *Thoughts*, leſſe faile, if you tell One, that ſuch an *One* ſhal name one of *Twenty Men*, than if it were *One* of *Twenty Cards*. The *Experiment* of *Binding* of *thoughts*, would be Diuerſified, and tried to the Full: And you are to note, whether it hit for the moſt part, though not alwaies.

957 It is good to conſider, vpon what *Things*, *Imagination* hath moſt Force: And the *Rule* (as I conceiue) is, that it hath moſt *Force* vpon *Things*, that haue the *Lighteſt*, and *Eaſieſt Motions*. And therefore aboue all, vpon the *Spirits* of *Men*: And in them, vpon ſuch *Affections*, as moue *Lighteſt*; As vpon *Procuring* of *Loue*; *Binding* of *Luſt*, which is

euer with *Imagination*; vpon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoeuer is of this kinde would be throughly enquired. *Trialls* likewise would be made vpon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Die this yeare; And will him, at these and these times, to goe vnto it, to see how it thriueth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*; And there is a *Folly* very vsuall, that *Gamesters* imagine, that some that stand by them, bring them ill Lucke. There would be Triall also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such a *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light Motions*. And howsoeuer I haue no *Opinion* of these things, yet so much I conceiue to be true; That *Strong Imagination* hath more Force vpon *Things Liuing*; Or that haue beene *Liuing*, than *Things* meerely *Inanimate*: And more Force likewise vpon *Light*, and *Subtill Motions*, than vpon *Motions Vehement*, or *Ponderous*.

It is an vsuall *Obseruation*, that if the *Body* of One *Murthered*, bee brought before the *Murtherer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, vpon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there haue beene such like *Motions*, as well where the *Party Murthered* hath beene *Strangled*, or *Drowned*, as where they haue beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Iust Iudgement, who vsually bringeth *Murthers* to Light: But if it be *Naturall*, it must be referred to *Imagination*. 958

The *Tying* of the *Point* vpon the day of *Marriage*, to make *Men* Impotent towards their *Wiues*, which (as we haue formerly touched,) is so frequent in *Zant* and *Gascony*, if it be *Naturall*, must bee referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceiue it to haue the lesse Affinity with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are) but any *Body* may doe it. 959

Experiments in Consort, touching the *Secret Vertue* of *Sympathy*, and *Antipathy*.

THere be many *Things* that worke vpon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, haue beene anciently and generally Receiued; And curiously assigned to worke seuerall *Effects*. So much is true; That *Stones* haue in them fine *Spirits*; As appeareth by their *Splendor*: And therefore they may worke by *Consent* vpon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be giuen to them. But it is manifest, that *Light*, aboue all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Nouelty*. And this is one of the *Causes*, why *Precious Stones* comfort. And therefore it were good to haue *Tincted Lanthornes*, 960

or *Tinctled Skreenes*, of *Glaſſe Cloured* into *Greene*, *Blew*, *Carnation*, *Crimſon*, *Purple*, &c. And to vie them with *Candles* in the *Night*. So likewiſe to haue Round *Glaſſes*, not only of *Glaſſe Coloured thorow*, but with *Colours* laid betweene *Cryſtals*, with *Handles* to hold in ones Hand. *Priſmes* are alſo Comfortable Things. They haue of *Paris-worke*, *Looking-Glaſſes*, bordered with broad *Borders* of ſmall *Cryſtall*, and great Counterfeit *Pretious Stones*, of all *Colours* that are moſt Glorious and Pleaſant to behold; Eſpecially in the *Night*. The *Pictures* of *Indian Feathers*, are likewiſe Comfortable, and Pleaſant to behold. So alſo Faire and Cleere *Pooles* doe greatly comfort the *Eyes* and *Spirits*; Eſpecially when the *Sun* is not *Glaring*, but *Ouer-caſt*; Or when the *Moone* ſhineth.

961 There be diuers Sorts of *Bracelets* fit to *Comfort* the *Spirits*; And they be of Three *Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wiſh them to be of *Pearle*, or of *Corall*, as is vſed: And it hath beene noted that *Corall*, if the *Party* that weareth it be ill diſpoſed, will wax *Pale*: Which I beleeue to be true, becauſe otherwiſe *Diſtemper* of *Heat* will make *Corall* loſe Colour. I Commend alſo *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with ſome *Cordiall Mixture*.

962 For *Corroboration* and *Comfortation*, take ſuch *Bodies* as are of *Aſtringent Quality*, without *Manifeſt Cold*. I commend *Bead-Amber*; which is full of *Aſtriction*, but yet is *Vnctuous*, and not *Cold*; And is conceiued to *Impinguate* thoſe that weare ſuch *Beads*: I commend alſo, *Beads* of *Harts-Horne*, and *Iuory*, which are of the like Nature; Alſo *Orenge-Beads*; Alſo *Beads* of *Lignum Aloes*, *Macerated* firſt in *Roſe-Water*, and *Dried*.

963 For *Opening*, I Commend *Beads*, or *Peeces* of the *Roots* of *Cardnus Benedictus*: Alſo of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

964 The Crampe (no doubt,) commeth of *Contraction* of *Sinnewes*; Which is Manifeſt, in that it commeth either by *Cold* or *Drineſſe*; As after *Conſumptions*, and *Long Agues*: For *Cold* and *Drineſſe* doe (both of them) *Contract*, and *Corrugate*. Wee ſee alſo, that *Chafing* a little aboue the *Place* in paine, eaſeth the *Crampe*; Which is wrought by the *Dilatation*, of the *Contracted Sinnewes*, by *Heat*. There are in vſe for the Preuention of the *Crampe*, two Things; The one *Rings* of *Sea Horſe-Teeth*, worne vpon the *Fingers*; The other *Bands* of *Greene Periwinkle* (the Herbe) tied about the *Calfe* of the *Leg*, or the *Thigh*, &c. where the *Crampe* vſeth to come. I doe finde this the more ſtrange, becauſe Neither of theſe haue any *Relaxing Vertue*, but rather the Contrary. I iudge therefore, that their *working* is, rather vpon the *Spirits*, within the *Nerues*, to make them ſtriue leſſe; Than vpon the *Bodily Subſtance* of the *Nerues*.

965 I would haue *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochiſch* of *Vipers*, made into little *Peeces* of *Beads*; For ſince they doe great Good Inwards (eſpecially for *Peſtilent Agues*) it is like they will be Effectuall Outwards; Where they may be applied in greater *Quantity*. There would be *Trochiſh* likewiſe made

made of *Snakes*; Whose *Flesh dried*, is thought to haue a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes:* The *Beads* would bee made vp with *Amber-Grice*, and some *Pomander*.

966 It hath beene long receiued, and confirmed by diuers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth helpe the *Falling-Sickneſſe*; And likewiſe the *Incubus*, which wee call the *Mare*. The *Cauſe* of both theſe *Diſeaſes*, and eſpecially of the *Epilepſie* from the *Stomach*, is the *Groſſeneſſe* of the *Vapours*, which riſe and enter into the *Cells* of the *Braine:* And therefore the *working* is, by *Extreme*, and *Subtill Attenuation*; Which that *Simple* hath. I Iudge the like to be in *Caſtoreum*, *Muske*, *Rew-Seed*, *Agnus Caſtus Seed*, &c.

967 There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Noſe:* Which (no doubt) is by *Aſtriction* and *Cooling* of the *Spirits*. *Quære*, if the *Stone* taken out of the *Toads Head*, be not of the like Vertue? For the *Toad* loueth *Shade*, and Coolneſſe.

968 *Light* may bee taken from the *Experiment* of the *Horſe-Tooth-Ring*, and the *Garland* of *Periwinckle*, how that thoſe things which aſſwage the *Strife* of the *Spirits*, doe helpe diſeaſes, contrary to the *Intention* deſired: For in the *Curing* of the *Crampe*, the *Intention* is to relax the *Sinnewes*; But the *Contraction* of the *Spirits*, that they ſtriue leſſe, is the beſt Helpe: So to procure eaſie *Trauailes* of *women*, the Intenſion is to bring downe the *Childe*; But the beſt Helpe is, to ſtay the *Comming downe* too *Faſt:* Whereunto they ſay, the *Toad-Stone* likewiſe helpeth. So in *Peſtilent Feuers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Enapouration*; But the beſt *Meanes* to doe it, is by *Nitre*, *Diaſcordium*, and other *Coole Things*, which doe for a time arreſt the *Expulſion*, till *Nature* can doe it more quietly. For as one ſaith prettily; *In the Quenching of the Flame of a Peſtilent Ague, Nature is like People, that come to quench the Fire of a Houſe; which are ſo buſie, as one of them letteth another.* Surely, it is an Excellent *Axiome*, and of Manifold *Vſe*, that whatſoeuer appeaſeth the *Contention* of the *Spirits*, furthereth their *Action*.

969 The *Writers* of *Naturall Magicke*, commend the Wearing of the *Spoile* of a *Snake*, for *Preſerning* of *Health*. I doubt it is but a *Conceit*; For that the Snake is thought to renue her *Youth*, by Caſting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, becauſe thoſe Renue.

970 It hath beene Anciently *Receiued*, (For *Pericles* the *Athenian* vſed it,) and it is yet in vſe, to weare little *Bladders* of *Quick-Siluer*, or *Tablets* of *Arſenicke*, as *Preſeruatiues* againſt the *Plague:* Not as they conceiue, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poiſons* themſelues, they draw the *Venome* to them, from the *Spirits*.

971 *Vide* the *Experiments* 95. 96. and 97. touching the *Seuerall Sympathies*, and *Antipathies*, for *Medicinall Vſe*.

972 It is ſaid, that the *Guts* or *Skin* of a *Wolfe* being applied to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beaſt* of great *Edacity*, and *Diſgeſtion*; And ſo it may bee, the *Parts* of him comfort the *Bowels*.

973 We ſee *Scare-Crowes*, are ſet vp to keepe *Birds* from *Corne*, and *Fruit*; It is reported by ſome, that the *Head* of a *Wolfe*, whole, dried, and hanged vp in a *Doue-Houſe*, will ſcare away *Vermine*; Such as are *Weaſils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For thoſe *Vermine* with vs, know *Dogs* better than *Wolues*.

974 The *Braines* of ſome *Creatures* (when their *Heads* are roaſted) taken in *Wine*, are ſaid to ſtrengthen the *Memory*: As the *Braines* of *Hares*, *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it ſeemeth, to bee incident to the *Braines* of thoſe *Creatures*, that are Fearefull.

975 The *Ointment* that *Witches* vſe, is reported to bee made of the *Fat* of *Children*, digged out of their *Graues*; Of the *Iuices* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I ſuppoſe that the *Soporiferous Medicines* are likeſt to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaues*, &c.

976 It is reported by ſome, that the *Affections* of *Beaſts*, when they are in Strength, doe adde ſome *Vertue*, vnto *Inanimate Things*; As that the *Skin* of a *Sheepe*, deuoured by a *Wolfe*, moueth *Itching*; That a *Stone* bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder*, prouoketh *Choler*.

977 It hath beene obſerued, that the *Diet* of *Women* with *Childe*, doth worke much vpon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed* (the *Nature* of both which is to repreſſe and ſtay *Vapours*, that aſcend to the *Braine*) it will make the *Childe* Ingenious: And on the contrary ſide, if the *Mother* eat (much) *Onions*, or *Beanes*, or ſuch *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Faſt* much; Or be giuen to much *Muſing*; (All which ſend, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the ſame Iudgement of *Tobacco*, often taken by the *Mother*.

978 The *Writers* of *Naturall Magicke* report, that the *Heart* of an *Ape*, worne neere the *Heart*, comforteth the *Heart*, and increaſeth *Audacity*. It is true, that the *Ape* is a Merry and Bold *Beaſt*. And that the ſame *Heart* likewiſe of an *Ape*, applied to the *Necke* or *Head*, helpeth the *Wit*; And is good for the *Falling-Sickneſſe*: The *Ape* alſo is a Witty *Beaſt*, and hath a *Dry Braine*; Which may be ſome *Cauſe* of *Attenuation* of *Vapours* in the *Head*. Yet it is ſaid to moue *Dreames* alſo. It may be, the *Heart* of a *Man* would doe more, but that it is more againſt *Mens* Mindes to vſe it; Except it be in ſuch as were the *Reliques* of *Saints*.

979 The *Fleſh* of a *Hedge-Hog*, Dreſſed and Eaten, is ſaid to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, muſt needs be *Harſh* and *Dry*, becauſe it putteth forth ſo many *Prickles*: For *Plants* alſo, that are full of *Prickles*,

Prickles, are generally Drie: As *Briars*, *Thornes*, *Berberries*: And therefore the *Aſhes* of a *Hedge-Hog* are ſaid to bee a great *Deſiccatiue* of *Fiſtyla's*.

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be aſcribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may alſo partake of a Secret *Propriety*; In that the *Bloud* draweth *Mans Fleſh*. And it is approued, that the *Moſſe* which groweth vpon the *Skull* of a *Dead Man* vnburied, will ſtanch *Bloud* potently. And ſo doe the *Dregs*, or *Powder* of *Bloud*, ſeuered from the *Water*, and *Dried*. 980

It hath beene practiſed, to make *white Swallowes*, by *Annointing* of the *Egges* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Annointing* of the *Eggs*, will be as Effectuall as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93. 981

Its reported, that the *white* of an *Egge*, or *Bloud*, mingled with *Salt-water*, doth gather the *Saltneſſe*, and maketh the *water* ſweeter. This may be by *Adheſion*; As in the 6. *Experiment* of *Clariſication*: It may be alſo that *Bloud*, and the *white* of an *Egge*, (which is the *Matter* of a *Liuing Creature*,) haue ſome *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We ſee that *Salt*, laid to a *Cut finger*, healeth it; So as it ſeemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*. 982

It hath beene anciently receiued, that the *Sea-Haire*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the Body,) and erodeth them. Whereof the *Cauſe* is conceiued to be, a *Quality* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* haue vpon the *Watrie Parts* of the *Body*; As *Vrine* and *Hydropicall water*. And it is a good *Rule*, that whatſoeuer hath an *Operation* vpon certaine *Kinds* of *Matters*, that, in *Mans Bodie*, worketh moſt vpon thoſe *Parts*, wherein that Kind of *Matter* aboundeth. 983

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathie* with the ſame *Thing*, when it is *Aliue*, and when it is *Sound*; And with thoſe *Parts*, which doe *Excerne*: As a *Carkaſſe* of *Man* is moſt *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horſe* to an *Horſe*, &c. *Purulent Matter* of *wounds*, and *Vlcers*, *Carbuncles*, *Pockes*, *Scabs*, *Leproſie*, to *Sound Fleſh*; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are leſſe Pernicious than the *Corruptions*. 984

It is a Common *Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection*, ſome Petty *Fellow* is ſent out to kill *Dogs*; And that though they haue neuer ſeene him before, yet they will all come forth, and barke, and fly at him. 985

The *Relations* touching the *Force* of *Imagination*, and the *Secret Inſtincts* of *Nature*, are ſo vncertaine, as they require a great deale of *Examination*, ere we conclude vpon them. I would haue it firſt throughly inquired, whether there be any Secret Paſſages of *Sympathy*, betweene 986

Perſons

Persons of neare Bloud; As *Parents*, *Children*, *Brothers*, *Sisters*, *Narse-Children*, *Husbands*, *Wiues*, &c. There be many Reports in *History*, that vpon the *Death* of *Persons* of such Neareneſſe, *Men* haue had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to diuers *English Gentlemen*; That my *Fathers House* in the *Countrey*, was *Plaſtered* all ouer with *Blacke Mortar*. There is an Opinion abroad, (whether Idle or no I cannot say,) That louing and kinde *Husbands*, haue a *Senſe* of their *Wiues Breeding Childe*, by some *Accident* in their owne *Bodie*.

987 Next to those that are *Neare* in *Bloud*, there may be the like *Paſſage*, and *Inſtincts* of *Nature*, betweene great *Friends*, and *Enemies*: And sometimes the Reuealing is to Another *Person*, and not vnto the *Party* Himselfe. I remember *Philippus Commineus*, (a graue Writer,) reporteth; That the *Arch-Biſhop* of *Vienna*, (a *Reuerend Prelate*,) said (one day) after *Maſſe*, to *King Lewis* the eleuenth of *France*; *Sir your Mortall Enemie is dead*; What time *Duke Charles* of *Burgundy* was Slaine, at the *Battell* of *Granſon*, against the *Switzers*. Some triall also would be made, whether *Pact* or *Agreement* doe any thing; As if two *Friends* should agree, that such a *Day* in euery *weeke*, they being in farre *Diſtant Places*, should *Pray* one for Another; Or should put on a *Ring*, or *Tablet*, one for anothers Sake; Whether if one of them should breake their *Vow* and *Promiſe*, the other should haue any *Feeling* of it, in *Abſence*.

988 If there be any *Force* in *Imaginations* and *Affections* of *Singular Perſons*; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote Parts*, whether is there not some *Senſe* thereof, in the *People* whom it concerneth; Because of the great *Ioy* or *Griefe*, that many *Men* are poſſeſt with, at once? *Pius Quintus*, at the very time, when that Memorable *Victory* was won, by the *Chriſtians*, against the *Turkes*, at the *Nauall Battell* of *Lepanto*, being then hearing of *Cauſes* in *Conſiſtory*, brake off suddenly, and said to those about him; *It is now more time, we should giue thankes to God, for the great Victory he hath graunted vs againſt the Turkes*. It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meerely his Worke, to conclude that *League*. It may be, that *Reuelation* was *Diuine*; But what shall we say then, to a *Number*, of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Plaies* haue had Newes of *Victories*, and *Ouerthrowes*, some few dayes, before any *Meſſenger* could come.

It is true, that that may hold in theſe Things, which is the generall *Root* of *Superſtition*: Namely, that *Men* obſerue when *Things Hit*, and not when they *Miſſe*: And commit to Memory to the one, And forget and paſſe ouer the other. But touching *Diuination*, and the *Miſgiuing* of *Mindes*, wee

shall

ſhall ſpeake more, when we handle in generall, the *Nature* of *Minds*, and *Soules*, and *Spirits*.

989 We haue giuen formerly ſome *Rules* of *Imagination*; And touching the *Fortifying* of the Same. We haue ſet downe alſo ſome few *Inſtances*, and *Directions*, of the *Force* of *Imagination*, vpon *Beaſts*, *Birds*, &c. vpon *Plants*, And vpon *Inanimate Bodies*: Wherein you muſt ſtill obſerue, that your *Trialls* be vpon *Subtill* and *Light Motions*, and not the contrary; For you will ſooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*, And I leaue it to euery *Man*, to chooſe *Experiments*, which himſelfe thinketh moſt Commodious; Giuing now but a few *Examples* of euery of the Three Kindes.

990 Vſe ſome *Imaginant*, (obſeruing the *Rules* formerly preſcribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dog* from *Barking*. Trie alſo the *Imagination* of ſome, whom you ſhal accommodate with things to fortifie it, in *Cocke-fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried alſo in *Flying* of *Hawkes*; Or in *Courſing* of a *Deere*, or *Hare*, with *Grey-Hounds*; Or in *Horſe-Races*; And the like *Comparatiue Motions*: For you may ſooner by *Imagination*, quicken or ſlacke a *Motion*, than raiſe or ceaſe it; As it is eaſier to make a 991 *Dog* goe ſlower, than to make him ſtand ſtill that he may not runne.

In *Plants* alſo, you may trie the *Force* of *Imagination*; vpon the *Lighter* Sort of *Motions*: As vpon the Sudden *Fading*, or Liuely *Comming vp* of *Herbs*; Or vpon their *Bending* one way, or other; Or vpon their *Cloſing*, and *Opening*; &c.

992 For *Inanimate Things*, you may trie the *Force* of *Imagination*, vpon Staying the *Working* of *Beere*, when the *Barme* is put in; Or vpon the *Comming* of *Butter*, or *Cheeſe*, after the *Cherming*, or the *Rennet* bee put in.

993 It is an Ancient *Tradition*, euery where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth ſtupefie the *Hand* of him that toucheth it. It is one degree of *Working* at *Diſtance*, to worke by the Continuance of a Fit *Medium*; As *Sound*, will be conueyed to the *Eare*, by ſtriking vpon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

994 The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts* of *Liuing Creatures*; So as they be taken from them, the *Creatures* remaining ſtill aliue: As if the *Creature* ſtill liuing did infuſe ſome *Immateriate Vertue*, and *Vigour*, into the *Part Seuered*. So much may be true; that any *Part*, taken from a *Liuing Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, *dying* of it *Selfe*, becauſe it is fuller of *Spirit*.

995 Triall would be made, of the like *Parts* of *Indiuidualls*, in *Plants*, and *Liuing Creatures*; As to cut off a *Stocke* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to ſee whether it will Decay the Reſt of the *Stocke*: Or if you ſhould cut off part of the *Taile*, or *Legge* of a *Dogge*,

or

or a *Cat*, and lay it to *Putrifie*, and ſo ſee whether it will *Feſter* or keepe from *Healing*, the *Part* which remaineth.

996 It is receiued, that it helpeth to *Continue Loue*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloued*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Gloue*, or other like *Fauour*, may as well doe it.

997 The *Sympathie* of *Indiuidualls*, that haue beene *Entire*, or haue *Touched*, is of all others the moſt *Incredible*: Yet according vnto our faithfull Manner of *Examination* of *Nature*, we will make ſome little mention of it. The *Taking away* of *warts*, by *Rubbing* them with ſomewhat that afterwards is put to waſte, and conſume, is a Common *Experiment*: And I doe apprehend it the rather, becauſe of mine owne *Experience*. I had, from my *Childhood*, a *wart* vpon one of my *Fingers*; Afterwards when I was about Sixteene Yeares old, being then at *Paris*, there grew vpon both my *Hands* a Number of *warts*, (at the leaſt an hundred,) in a Moneths Space. The *Engliſh Embaſſadours Ladie*, who was a *Woman* farre from *Superſtition*, told me, one day; Shee would helpe mee away with my *warts*: Whereupon ſhee got a *Peece* of *Lard*, with the *Skin* on; and rubbed the *warts* all ouer, with the *Fat Side*; And amongſt the reſt that *Wart*, which I had had from my *Childhood*; Then ſhee nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, vpon a *Poaſt* of her *Chamber window*, which was to the *South*. The Succeſſe was, that within fiue weekes ſpace, all the *warts* went quite away: And that *wart*, which I had ſo long endured, for Company. But at the reſt I did little maruell, becauſe they came in a Short time, and might goe away in a Short Time againe: But the Going away of that, which had ſtayed ſo long doth yet ſticke with me. They ſay the like is done, by the *Rubbing* of *warts* with a Greene *Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tryed, with *Cornes*, and *Wens*, and ſuch other *Excreſcences*. I would haue it alſo tried, with ſome *Parts* of *Liuing Creatures*, that are neareſt the *Nature* of *Excreſcences*; As the *Combs* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beaſts*, &c. And I would haue it tried both waies; Both by *Rubbing* thoſe *Parts* with *Lard* or *Elder*, as before; And by *Putting off* ſome *Peece* of thoſe *Parts*, and laying it to *Conſume*; To ſee whether it will Worke any Effect, towards the *Conſumption* of that *Part* which was once *Ioyned* with it.

998 It is conſtantly Receiued, and Auouched, that the *Anointing* of the *weapon*, that maketh the *Wound*, will heale the *Wound* it ſelfe. In this *Experiment*, vpon the Relation of *Men* of *Credit*, (though my ſelfe, as yet, are not fully inclined to beleeue it,) you ſhall note the *Points* following. Firſt, the *Ointment*, wherewith this is done, is made of Diuers *Ingredients*; whereof the Strangeſt and Hardeſt to come by, are the *Moſſe* vpon the *Skull* of a *dead Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. Theſe two laſt I could eaſily ſuſpect to be preſcribed as a Starting Hole; That if the *Experiment* proued not, it mought be pretended, that the *Beaſts* were not killed in the due Time;

For

For as for the *Mosse*, it is certain, there is great Quantity of it in *Ireland* vpon *Slaine Bodies*, laid on *Heapes*, *Vnburied*. The other *Ingredients* are, the *Blood-Stone* in *Powder*, and some other *Things*, which seem to haue a *Vertue* to *Stanch Blood*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in the *Chymical Dispensatory* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *Weapon*. Thirdly, (which I like well) they do not obserue the *Confecting* of the *Ointment* vnder any certaine *Constellation*; which commonly is the Excuse of *Magicall Medicines*, when they faile, that they were not made vnder a fit *Figure* of *Heauen*. Fourthly, it may be applied to the *weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the Party, to be *Cured*, is not needfull to Concurre; For it may be done, without the Knowledge of the *Party wounded*; And thus much hath beene tryed, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *Weapon*, without the knowledge of the *Partie Hurt*, and presently the *Party Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reanointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Anointing* of that *Instrument* will serue, and worke the *Effect*. This I doubt should be a Deuice, to keep this strange *Forme* of *Cure*, in Request, and Vse; Because many times you cannot come by the *Weapon* it selfe. Seuenthly, the *Wound* must be at first *washed cleane*, with *White Wine*, or the *Parties* owne *Water*; And then bound vp close in *Fine Linnen*, and no more *Dressing* renewed, till it be *whole*. Eightly, the *Sword* it selfe must be *Wrapped* vp *Close*, as farre as the *Ointment* goeth, that it taketh no *wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keepe it, will *Serue againe*; and rather *Increase* ~~in vertue~~, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointments* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*, which I like best of all the rest, because it subiecteth the *Matter*, to an *Easie Triall*.

I Would haue *Men* know, that though I reprehend, the *Easie Passing ouer*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*;) For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not vnderstand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be Cooling; For that wil hinder the *Opening* which the *Disease* requireth: That it must not be *Hot* For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receiue from *Experience*, that *Powder* of *Chamæpytis*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Phisitian* doth not continue still

Experiment Solitary, touching *Secret Proprieties*.

999

ſtill the ſame *Medicine*, to a *Patient*; But he will vary, if the firſt *Medicine* doth not apparantly ſucceed: For of thoſe *Remedies*, that are good for the *Iaundies*, *Stone*, *Agues*, &c. that will do good in one *Body*; which will not doe good in Another; According to the Correſpondence the *Medicine* hath to the *Individuall Bodie*.

Experiment Solitary, touching the *Generall Sympathy of Mens Spirits*.

1000

THe *Delight* which *Men* haue in *Popularitie*, *Fame*, *Honour*, *Submiſſion*, & *Subiection* of other *Mens Minds*, *wils*, or *Affections*, (although theſe *Things* may be deſired for other *Ends*) ſeemeth to be a *Thing*, in it ſelfe, without Contemplation of Conſequence, Gratefull and agreeable to the *Nature* of *Man*. This Thing (ſurely) is not without ſome Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Diuine Limbus*; Elſe why ſhould *Men* be ſo much affected with that, which others thinke, or ſay? The beſt Temper of *Mindes* deſireth *Good Name*, and *True Honour*: The Lighter, *Popularity*, and *Applauſe*; The more depraued, *Subiection*, and *Tyranny*; As is ſeene in great *Conquerours*, and *Troublers* of the *world*: And yet more in *Arch-Heretikes*; for the Introducing of new *Doctrines*, is likewiſe an *Affectation* of *Tyrannie*, ouer the *Vnderſtandings*, and *Beleefes* of *Men*.

A TABLE OF the Experiments.

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FINIS.

NEW ATLANTIS.

A Worke vnfinished.

Written by the Right Honourable, FRANCIS *Lord Verulam, Viſcount St. Alban.*